

The background of the page is a photograph of a forested hillside. In the foreground, there are several green and white fire trucks. The truck on the right has "FULTON HOTSHOTS" written on its side. The text is centered and reads:

The Alta Sierra Community Wildfire Protection Plan
Created by
HangFire Environmental
for the
Kern River Fire Safe Council
and the citizens they strive to protect.
December 2004

The Alta Sierra Community Fire Safe Action Plan was funded by a grant to the Kern River Valley Fire Safe Council by the United States Department of Agriculture-Forest Service, National Fire Plan-Economic Action Program.

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Dedication



This Fire Safe Plan is dedicated to the men and women of the fire agencies surrounding Alta Sierra that constantly place themselves in harm's way for the protection of life, property, and natural resources.

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Members of the council that deserve special thanks include Robin Wyatt Little for her endless correspondence and sense of humor. Robin kept the project on track and made sure progress was always being made. Grant administrator Rich Olson provided almost daily guidance and direction. This plan could not have come to fruition without his dedication, time, and most importantly...patience.

Members of the United States Forest Service were a great help during the home surveys, specifically during the fieldwork. Greenhorn District Fire Management Officer Daniel Kleinman insured my security by assigning Patrols to escort me during my home surveys. Chief Kleinman also provided a countless amounts of information in the form of numerous phone calls and emails. Fire Prevention Technicians Raul Estrada, George Bowen, and Cory Hoogendam each spent a day in the field walking door to door, looking for addresses, and providing valuable information about the mountain.

Other staff from the United States Forest Service (USFS) Greenhorn District Office were also invaluable to completing this plan. Battalion Chief Mark Chambers outlined the projects that were occurring and planned. Cannell Meadow District Fire Management Officer Scott Williams also provided project and weather information. Fire Captain Jim Bauer provided information about Alta Sierra from a response perspective and also provide information about water supply. Public Information Officer Margie Clack facilitated and coordinated information with the subcontractor. Countless amounts of Geographic Information Systems (GIS) data were provided from Nikki Washington and Heidi Hosler of the Sequoia National Forest Supervisor's Office.

Homeowner and fire safe advocate Dan Anglin provide a tour of upper Alta Sierra Road, new home sites, and fuel loading issues. He has constantly been concerned for the community and his time was priceless.

Finally, members of the Kern County Fire Department were instrumental to the completion of this plan. Battalion Chief Randy Cole for sharing his intimate knowledge of Alta Sierra and birthday dinner. Battalion Chief Ken Stevens assigned resources to the plan. Fire Captain Chuck Dickson is the aforementioned resource who always sent data in a timely manner. Members of Fire Station 76-Kernville for answering countless questions and sharing their ice cream. For those that I forgot to mention, my apologies.

Timothy P. Walsh

Executive Summary

The wildland fire scenario waiting to occur in Alta Sierra may be catastrophic! All of the components necessary for the entire community to disappear during a bad afternoon are in place. The community is positioned upslope from a high population area with a high number of wildland fires. Alta Sierra is isolated from a rapid wildland fire response from fire engines and other fire suppression resources. Fuel loading or vegetation is extremely high. This fuel loading will feed a fire that will burn into the community. Roads are narrow making evacuation difficult or impossible while fire engines try to make access into the community to protect structures. Structures are made of flammable wood that will ignite adding more fuel to the conflagration.

The goals of the Community Wildfire Protection Plan are to survey the homeowners to query what is understood about the fire problem and possible solutions. It will also quantify the amount of vegetation surrounding the community and list possible solutions reducing the fuel by utilizing marketable forest byproduct solutions. Homes have been surveyed to define which ones are at greatest risk from wildfire based on building materials and defensible space. Evacuation from a wildfire are examined with possible routes to safety identified.

Solutions are not simple, quick, or cost effective! Homes must be made fireproof or the fuel must be modified. Obviously, the later is the only realistic solution! It is up to the Community, the Sequoia National Forest, and other stakeholders to adopt the fuel reduction projects in this plan that will increase the community's odds of surviving a wildfire.

Objective of the Plan

The objective of this plan is to assist the Greenhorn Mountain Property Owners Association meet their mission.

Greenhorn Mountain Property Owner Association Mission Statement:

Our commitment to the Greenhorn Mountain Property Owners is:

- The fostering of community involvement
- The safety and betterment of our community
- The best knowledge and protection for our environment
- Making Alta Sierra a Fire Safe Community

To be the leading mountain community by providing infrastructure and an operating environment which attracts and retains THE BEST PEOPLE who by using THE BEST KNOWLEDGE can deliver THE BEST SERVICE to fully meet the geographic market we serve.

Meeting the Mission Statement

The community helped fund this plan by contributing generously towards its completion thus fostering community involvement. Obviously, this plan's focus is making the community safer and better prepared for the inevitable wildland fire. Utilizing this plan will provide knowledge and hopefully protection for the environment. Lastly, it will make Alta Sierra a fire safe community.



Figure 1: Members of the Greenhorn Mountain Property Owners Association listen to Division Chief Dan Kleinman report on fire safe fuel reduction currently being implemented throughout the community.

Introduction-Project Background and Scope:

The Kern River Valley Fire Safe Council (KRVFSC) under a National Fire Plan Grant developed the Kern River Valley Community Fire Safe Plan in 2002. Within this plan, the community of Alta Sierra was documented as having one of the greatest risks from a wildfire in the entire 750 square mile assessment area including the communities of Lake Isabella, Bodfish, Kernville, and Wofford Heights. The KRVFSC received a second grant from the United States Department of Agriculture-Forest Service, National Fire Plan-Economic Action Program. The focus of this grant is to assess Alta Sierra's wildfire risk and propose possible remedies to lessen the impact of the inevitable fire. The goals of the grant include:

- Prepare a Community Wildfire Protection Plan (the Plan) that will include:
 - A parcel-by-parcel inventory of hazards and structure construction.
 - A structure protection and evacuation plan.
 - Conduct a market survey of the Alta Sierra Stakeholders to determine what is known about the fire risk dangers and practices in the community.
 - Existing information about the high priority hazards, risks and values in Alta Sierra.

A separate contractor, TSS Consultants, identified fuel severity ratings within Alta Sierra. They also provided a tree thinning prescription and a

market assessment of small diameter and underutilized forest products that will be a byproduct of hazardous fuel removal. This document is titled the Alta Sierra Fuels Management Plan and is a stand-alone document.

- Information within this plan was used to assess vacant parcels.

HangFire Environmental



Timothy Walsh was hired to meet the goals of the grant and write the Alta Sierra Community Wildfire Protection Plan. As the Principal Analyst for HangFire Environmental, Timothy is a 20-year veteran of the fire service and is a professional Fire Captain Specialist with the Marin County Fire Department.

Prior to his employment with Marin County, Captain Walsh has served as a firefighter, helitack firefighter, fire apparatus engineer, fire captain, fire captain specialist, and battalion chief with the California Department of Forestry and Fire Protection (CDF).

Captain Walsh has the unique background of serving on both a CDF Incident Command Team as a Geographic Information Systems Technical Specialist and on a United States Forest Service Type I Incident Management Team as a Fire Behavior Analyst. This background has provided Captain Walsh the opportunity to perform analysis on wildfires in California, Nevada, Oregon, Idaho, Montana, Colorado, Wyoming, South Dakota, New Mexico, and Tennessee. He was also utilized at the Pentagon during the September 11, 2001 tragedy providing analysis and detailed maps for the Urban Search and Rescue Teams, the FBI, and others.

Captain Walsh's work has been featured in USA Today, the New York Times, the San Diego Union Tribune, and the Marin Independent Journal. He has contributed chapters in the books Disaster Response-GIS for Public Safety and Confronting Catastrophe-A GIS Handbook.

This document will focus on the wildfire problem surrounding Alta Sierra. It will survey those that live and work around Alta Sierra to listen to their wildfire concerns. It will assess hazards, assets, and fire weather in the area. It will provide recommendations concerning fuel reduction and building materials.

Fires Role

Fire is natural process. Its role as the forest burns is to reduce the overstocking of trees, eliminate some forms of pest and disease, and return nutrients and



Figure 2: A fire burning well into the early evening during the Deep Fire August 14, 2004 Sequoia National Forest. Photograph by Marilyn Knesel.

seeds into the soil. As settlers migrated and developed the region, the role of fire was considered dangerous and a suppress-all-fires attitude prevailed. Excluding wildfire lead to the build-up of vegetation that today fuels fires that are bigger, costlier, and

more damaging. With the number of homes found in Alta Sierra, it is inevitable that future wildfires will threaten or damage the life, health and property of the residents.

The purpose of this plan is to synergize the agencies and citizens of Alta Sierra. The emphasis of the plan is to inform all citizens of the potential of wildland fires and the mitigation strategies that may be employed. Strategies to protect residents and property from the potential impacts of wildfire include construction of shaded fuel breaks, prescribed burns, public education to prevent unwanted fires, and focused enforcement of the fire codes and laws within the Basin.

The Alta Sierra Community Fire Safe Plan is a recipe for making the community safer from wildfire. The ingredients include an assessment of the landscape to define hazards and risk. Included with the assessment will be pre-suppression strategies to reduce the impacts of a wildfire.

Treatment measures or mitigation strategies are not always popular amongst citizens within a community. Some people do not want a fuelbreak in their backyard while others realize the benefit. Some people see a prescribed burn as a forest destroyed versus a forest renewed. Some people do not want to

maintain a defensible space¹ around their dwelling while others realize that the odds of structure survivability increases significantly through this modest investment of time and money.

The next ingredient in the planning process is to define which pre-suppression strategies are understood and embraced by the citizens. A firesafe questionnaire was written and mailed to 388 homeowners. The survey's focus is to assess what firesafe perceptions are held by the community and where public education may be needed prior to implementing a firesafe project.

Fire Safe Survey

The Kern River Fire Safe Council mailed 388 surveys to homeowners in Alta Sierra and Shirley Meadows. Out of the 388 surveys sent to the homeowners in the Alta Sierra, 166 or over **42** percent were returned providing a very accurate picture of the perceptions and feelings concerning wildfires and prevention. The replies were entered into a database and answers were charted for easy interpretation. For many of the questions, the answer "maybe" was used when residents circled both "yes" and "no" on the survey.



Figure 3: A sign posted in the community reminds residents for the need to provide hazard reduction clearances. Photo by Timothy Walsh.

¹ Defensible space is defined as a perimeter of land reduced in vegetation to prevent fire from burning a home. Vegetation clearance should range in distance from 30-150 feet depending on slope, vegetation, and building materials.

Question One:

Which of the following statements best describes your residential status in Alta Sierra?

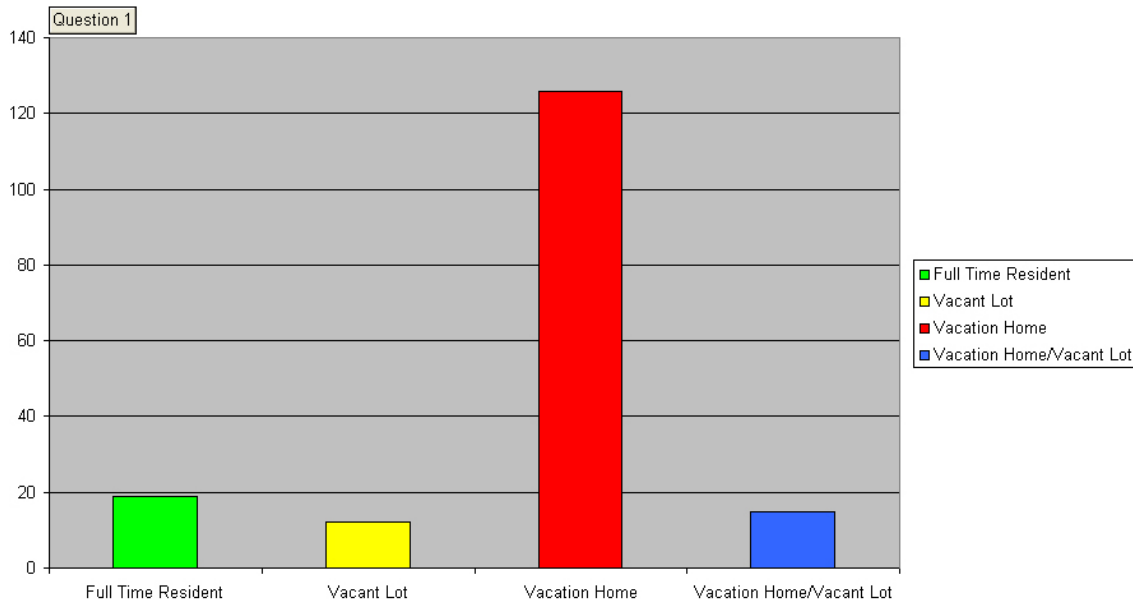


Chart 1: Survey Question Number One

Table 1: Statistics for Question One

Lot Status	Total	Percent
Full Time Resident	19	11.05
Vacant Lot	12	6.98
Vacation Home	126	73.26
Vacation Home/Vacant Lot	15	8.72

Although the answer to this question was most likely known by the Alta Sierra Community at large, this plan may be used to secure additional funding through grants. It may be an important statistic to show how many homes are at risk by part time owners. Residency is very important during a wildfire. First, there may not be as many people to evacuate in the event of a fast moving fire during the middle of the week. Many people may only use their vacation home on the weekends. This lack of people may also prevent more traffic congestion using what little egress there is for evacuation. Although not a safe practice, many people do not evacuate even when ordered to. Many of these homeowners provide structure protection by removing stacked firewood next to homes and putting out small fires on or under their decks with garden hoses. This can only be accomplished if the residents are home!

Question Two:

If the fire safe council wanted to publicize fire information, where would you most likely see or hear the information?

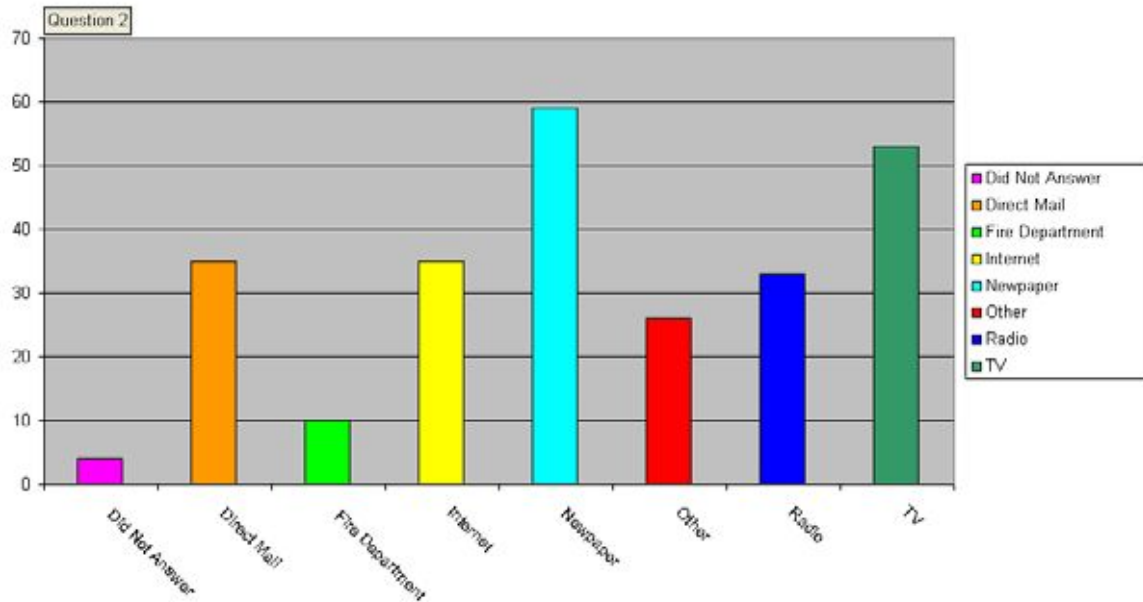


Chart 2: Survey Question Number Two

Table 2: Statistics for Question Two

Information Source	Total	Percent
Did Not Answer	4	1.57
Direct Mail	35	13.73
Fire Department	10	3.92
Internet 35		13.73
Newspapers 59		23.14
Other 26		10.20
Radio 33		12.94
TV 53		20.78

The results of this question are very perplexing. With the high number of homeowners owning vacation homes and residing in various towns, what media is the best form of communication? Almost one quarter of the replies stated the newspaper, but what paper should be utilized. The same question can be posed for the high number of responses for television and radio. After assessing the high number of replies to this survey combined with the high number of vacation homeowners, the fastest way to communicate fire information would be the Kern River Valley Fire Safe Council Website. An analysis based on owner's addresses found in the Greenhorn Property Owners Association 2003 Directory was performed. Out of the 307 resident listings, 133 have a Bakersfield's address, 35 have a Wofford Heights address, and 14 have a Ridgecrest address.

Question Three:

Does the natural vegetation around your property pose a threat to your house or a neighbor’s house?

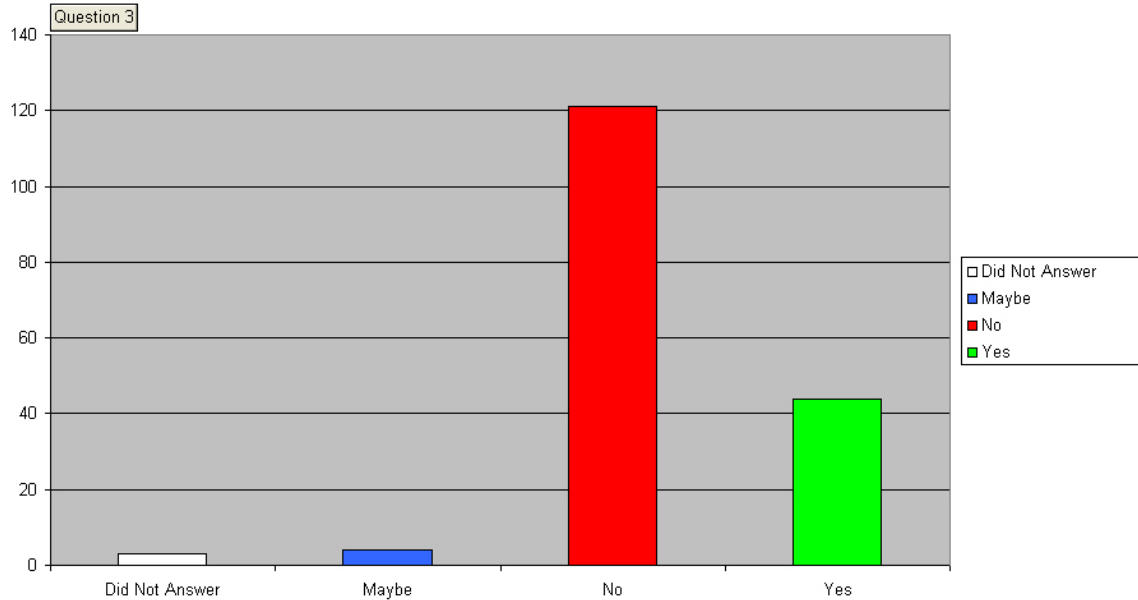


Chart 3: Survey Question Number Three

Table 3: Statistics for Question Three

Replies	Number	Percent
Did Not Answer	3	1.74
Maybe	4	2.33
No	121	70.35
Yes	44	25.58

Almost 71 percent of the homeowners believe that their natural vegetation does not pose a threat to themselves or to their neighbor. Most of the parcels, both vacant and with homes, host several trees. Numerous parcels are overstocked with small diameter trees that are both unhealthy and unsightly. Many of the trees overhang or touch either the deck or the roof of the home. Some even pass through the decks. If a wildfire occurs under windy conditions, these trees would pose a significant fire threat to both the owner’s home and their neighbors.

Many of the replies could have been based on the surface fuels where, in general, the community has done an outstanding job with removing small brush and pine needles. However, there may be a misconception about the fire hazards involved with coniferous trees. This may be an outstanding topic for a fire safe council to focus on for public education.

Question Four:

Are you concerned about neighboring parcels that have not been cleared for defensible space?

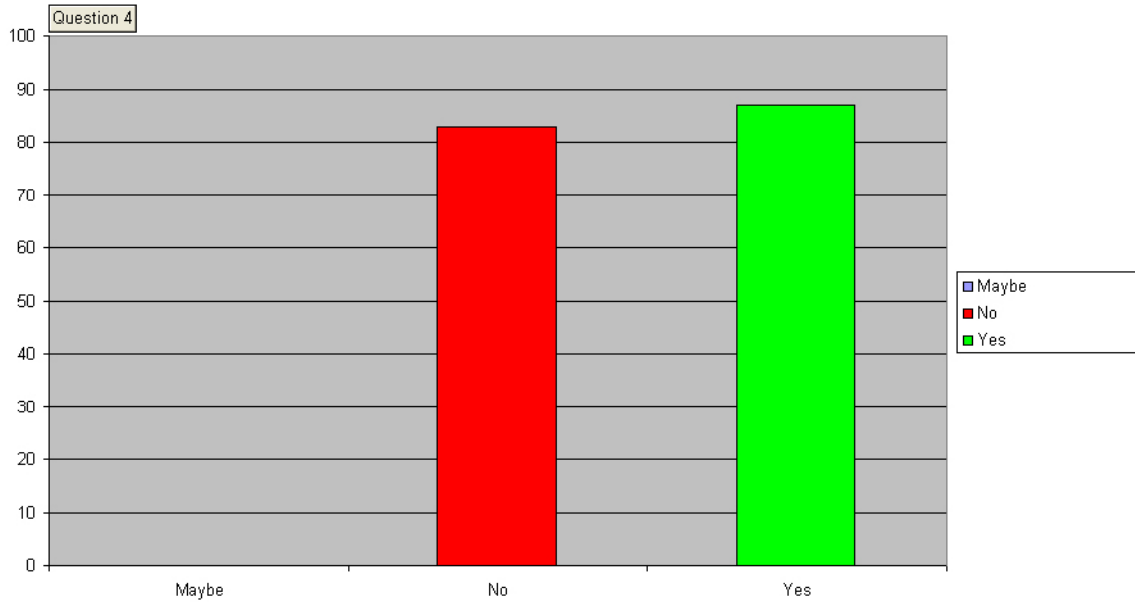


Chart 4: Survey Question Number Four

Table 4: Statistics for Question Four

Replies Number	Percent
Maybe 0	0.00
No 83	48.82
Yes 87	51.18

This is a very interesting reply compared to the previous question. Over 70 percent of the homeowners feel that their property does not pose a threat to themselves or their neighbors. When the vegetation is on the other side of the fence, over 50 percent of the replies feel that their neighbor's parcels are a fire threat. In some cases, where the land is owned by a public agency, this may be a very accurate answer. Another issue is privately owned vacant lots within the community. Several of these parcels have not been thinned and pose a threat to the neighboring structure. An analysis within this plan documents parcels that neighbor vacant lots with both public and private ownership.

Question Five:

Have you developed a wildfire evacuation plan for your household?

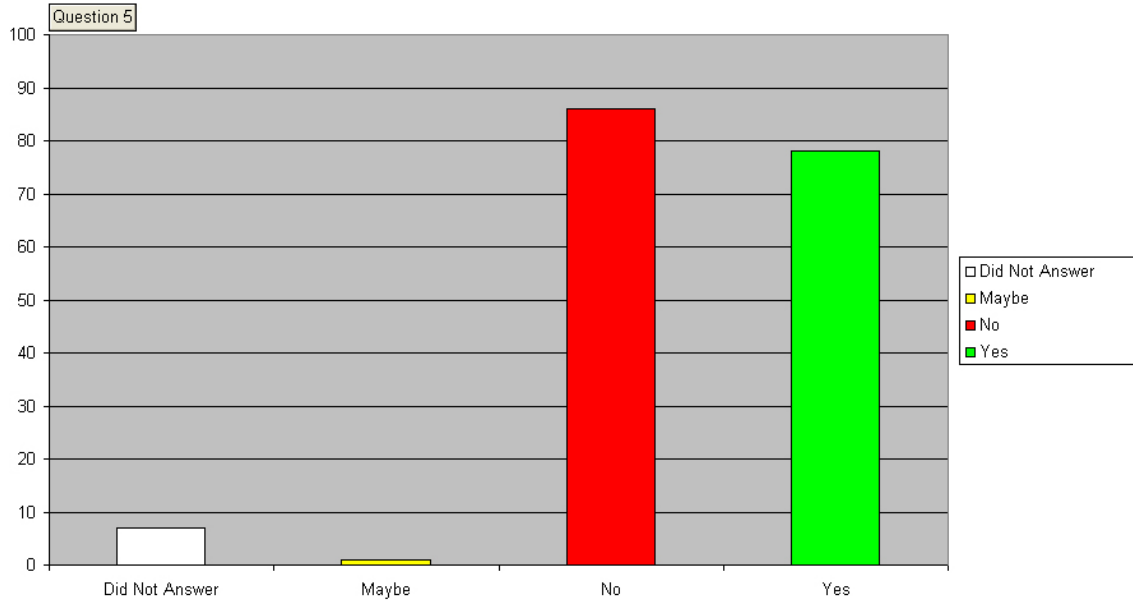


Chart 5: Survey Question Number Five

Table 5: Statistics for Question Five

Replies Number		Percent
Did Not Answer	7	4.07
Maybe 1		0.58
No 86		50.00
Yes 78		45.35

Almost half of the surveyed homeowners have prepared a wildfire evacuation plan for their houses. This is far more residences than anticipated. At least one-half of the homeowners have thought a potential wildfire is a big enough threat to develop an evacuation plan. But the level of planning performed by the residents should be assessed. Have they decided in the event of a wildfire, they will drive west on Highway 155 or have they really given some thought to an evacuation plan? Have factors such as fire size, direction of spread, and basic fire behavior been considered? Do they know they should leave the lights on making the structure more visible to firefighters? Do they know they should close curtains and blinds over windows to reduce ignition potential? Do they know combustible patio furniture should be moved away from their homes?

Question Six:

To your knowledge, does the Alta Sierra Community have a wildfire evacuation plan?

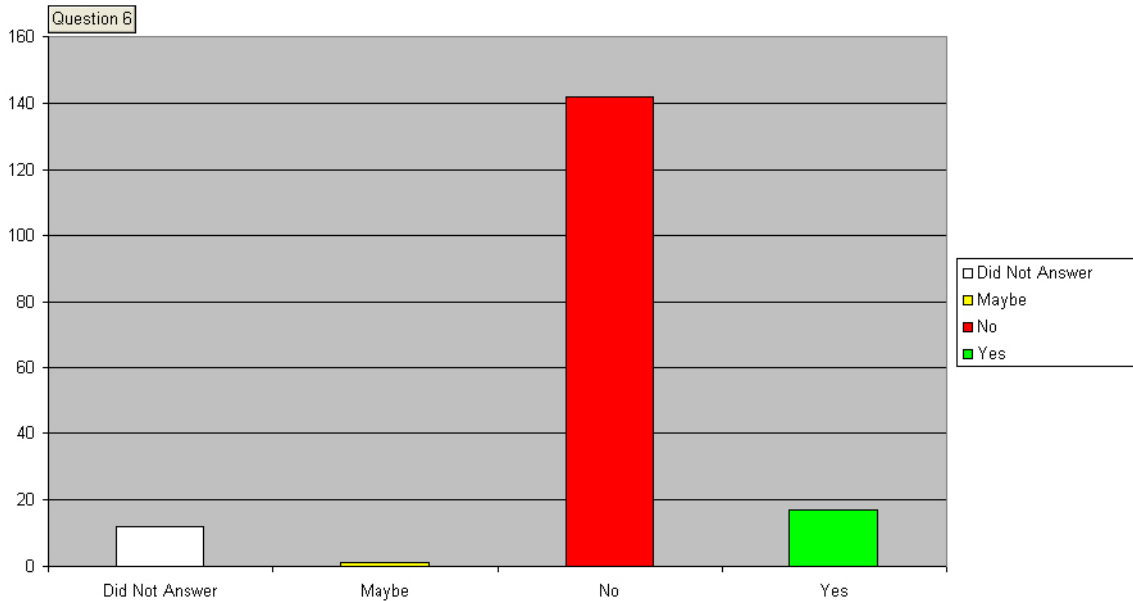


Chart 6: Survey Question Number Six

Table 6: Statistics for Question Six

Replies Number		Percent
Did Not Answer	12	6.98
Maybe 1		0.58
No 142		82.56
Yes 17		9.88

A large majority of the surveyed homeowners realize that there is currently no plan in existence to evacuate in the event of a wildfire. Possibly, a better question would have been, “If you were at your home during a wildfire, would you evacuate if an evacuation order was given?” This would really determine how much emphasis is needed with the development of an evacuation plan. Another pertinent question is how much time they spend at home in Alta Sierra. With only 11 percent of the surveyed homeowners stating that they are full-time residents, there may not be a large evacuation problem during the week. On the other hand, there may be a very serious problem during the weekends or holidays as witnessed during the Memorial Day Weekend!

Question Seven:

Are you aware of any community safety zones in Alta Sierra in the event of a wildfire evacuation?

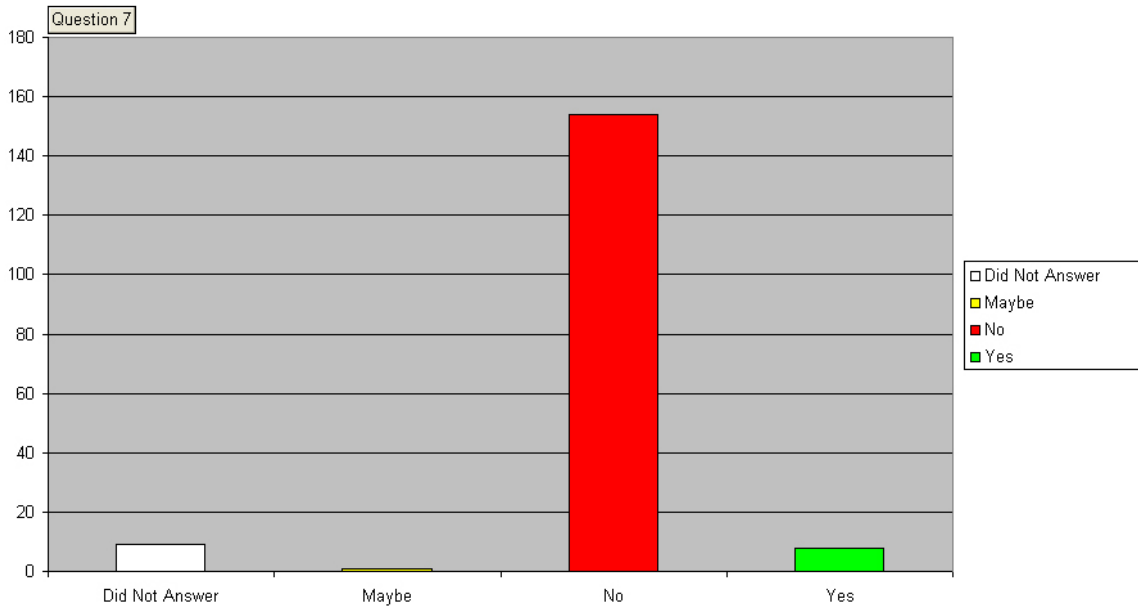


Chart 7: Survey Question Number Seven

Table 7: Statistics for Question Seven

Replies Number		Percent
Did Not Answer	9	5.23
Maybe 1		0.58
No 154		89.53
Yes 8		4.65

A large majority of the surveyed homeowners realize that there is not a community safety zone developed for Alta Sierra in the event of a wildfire. Unless considerable money is spent developing a community safety zone, this is the best impression the community could hold. Due to the high fuel loading combined with the communities' slope position; it would be difficult if not impossible to consider any place safe from a running crown fire². To implement a community safety zone, a large area of defensible space would need to be created combined with a large facility to accommodate over a thousand people made of fire resistive materials.

² Fires in the tops of the trees are referred to as crown fires. They occur when it is very dry, hot, and windy. They are extremely dangerous and combating them is usually futile.

Question Eight:

Do you, your family and neighbor have an emergency communication plan in the event of a wildfire situation?

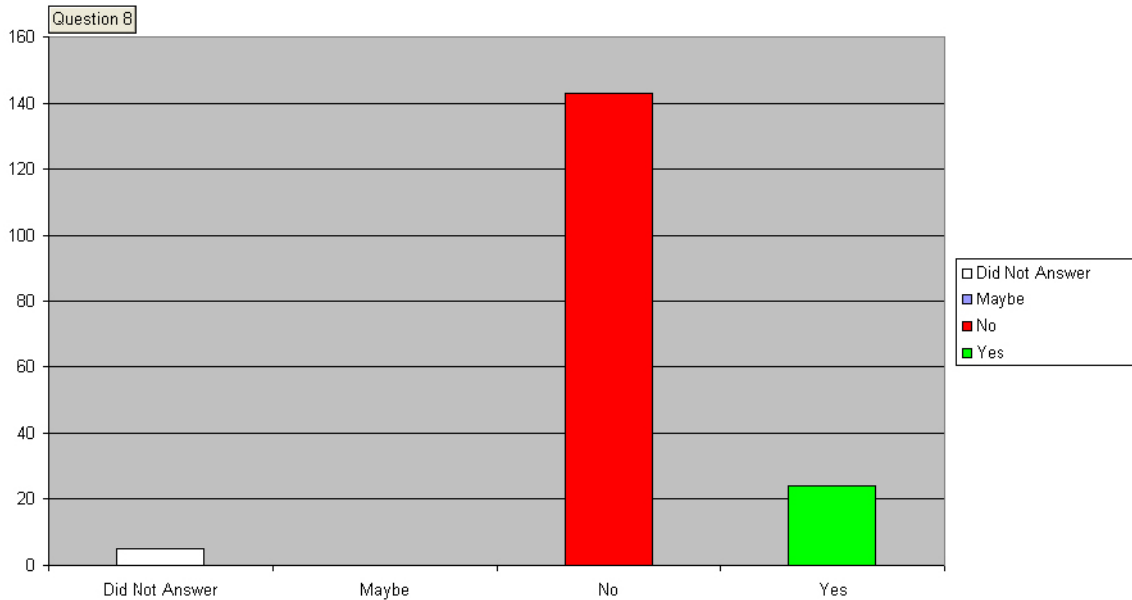


Chart 8: Survey Question Number Eight

Table 8: Statistics for Question Eight

Replies Number		Percent
Did Not Answer	5	2.91
Maybe 0		0.00
No 143		83.14
Yes 24		13.95

A large majority of the surveyed homeowners do not have an emergency communication plan. This question may be the first time they have given any thought to the idea of planning to communicate information during and after a wildfire. With the high number of vacation homes, residents may want to find out if a fire impacted their dwelling. If they are at their vacation or full-time home, they may want to communicate with friends or family their evacuation route. The property owner association may want to consider adopting a formal emergency communication plan. This would include informing residents where information would be posted. Fire information and structure damage could be posted on the Kern River Valley Fire Safe Council's website. A formal phone tree could be established between full-time residents and part-time homeowners.

Question Nine:

Do you have an awareness of how adequate the Alta Sierra Community water supply is in the event of a wildfire situation?

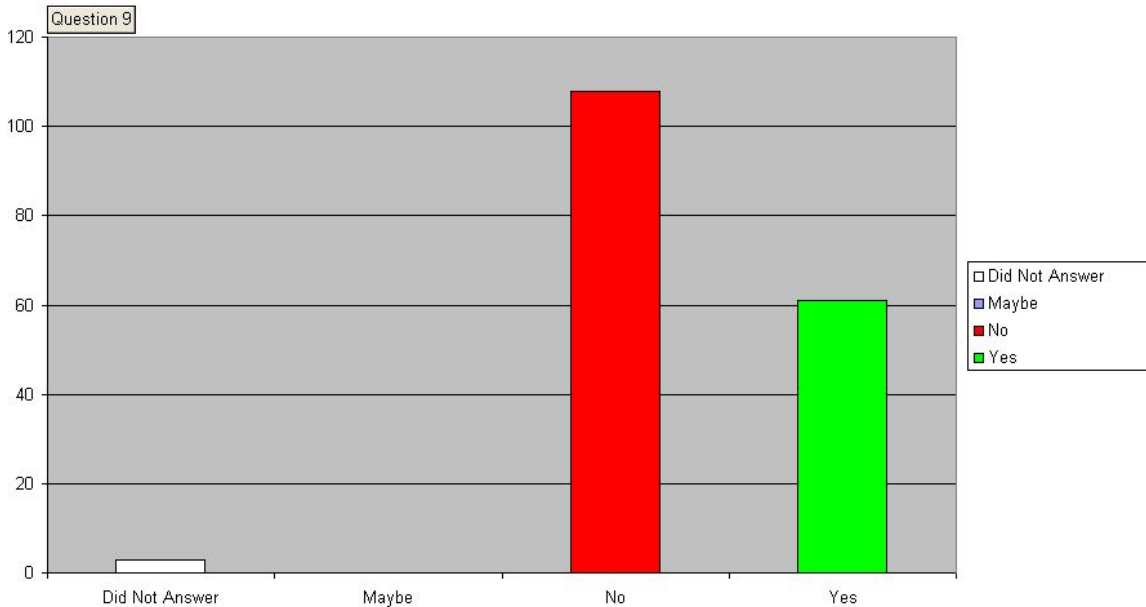


Chart 9: Survey Question Number Nine

Table 9: Statistics for Question Nine

Replies Number		Percent
Did Not Answer	3	1.74
Maybe 0		0.00
No 108		62.79
Yes 61		35.47

This is a somewhat ambiguous question. Do 35 percent of the residents know that the water supply is adequate? Do over 62 percent of the residents know that the water supply is inadequate? There are two water systems in place within the community. The Alta Sierra Mutual Water Company operates the older water system in the western side of the community. The Sierra Bella Water Company controls the water system in the eastern side of the community. The most obvious indicator of the water system is the hydrants. With a few exceptions, the hydrants on the newer system in the eastern portion of the community are traditional above ground served by either 4-inch or 6-inch pipes. The older western side of the community utilizes below or at ground connections that are identified by red boxes. The hose connections within the boxes are different sizes and are serviced by 2 ½ or 2 inch pipes.

Question Ten:

Do you know where the nearest water hookup is for emergency fire vehicles?

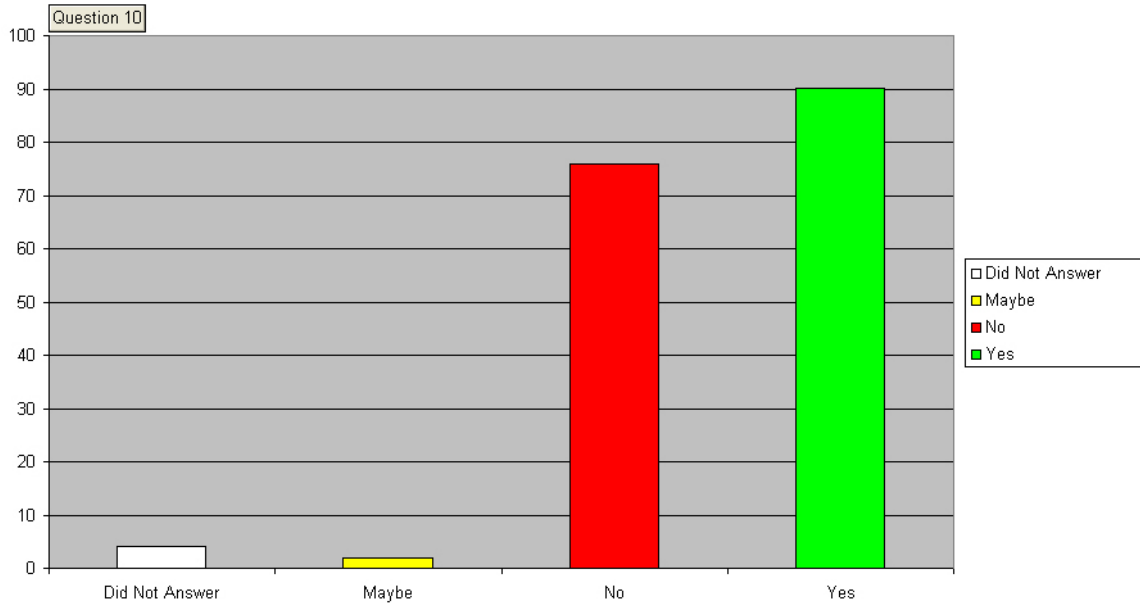


Chart 10: Survey Question Number Ten

Table 10: Statistics for Question Ten

Replies Number		Percent
Did Not Answer	4	2.33
Maybe 2		1.16
No 76		44.19
Yes 90		52.33

Over half of the replies state that they know where the hydrant is located but maybe the real question is do they know if it is a reliable water source? During the event of a wildfire, several thousand gallons of water are utilized. The current system would quickly be overwhelmed. For example, the older water system serving the western portion of the community can only refill the tanks at 30 gallons per minute with very little pressure. Most modern fire engines can discharge water at 500-1000 gallons per minute. If multiple structures become ignited, then water flow will exceed refill rates.

Question Eleven:

Do you and your family members know how to turn off the propane supply to your house?

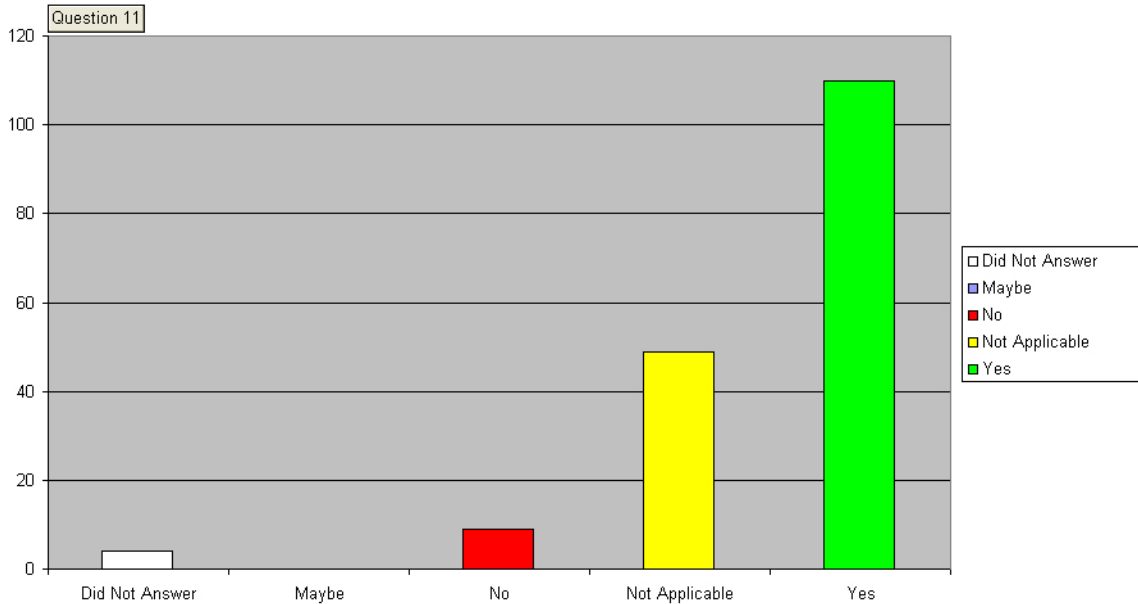


Chart 11: Survey Question Number Eleven

Table 11: Statistics for Question Eleven

Replies Number		Percent
Did Not Answer	4	2.33
Maybe 0		0.00
No 9		5.23
Not Applicable	49	28.49
Yes 110		63.95

A majority of the residents know how to shut off their propane. Over 25 percent of the residents may not have propane from the “Not Applicable” replies. For the few residents that do not know how to shut off their propane, a review during a property owners association meeting may be beneficial. Another approach would be to offer assistance and training from either the propane provider or fire department to teach residents how to shut off their propane.

Question Twelve:

Does your driveway provide adequate access for fire fighters, their equipment and trucks?

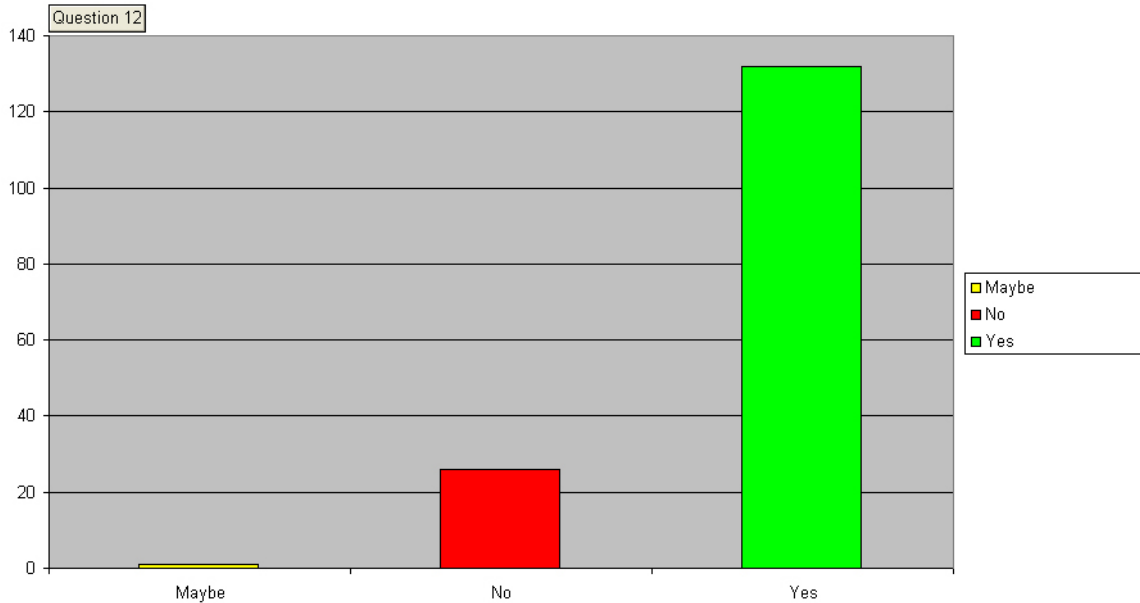


Chart 12: Survey Question Number Twelve

Table 12: Statistics for Question Twelve

Replies Number		Percent
Maybe 1		0.63
No 26		16.35
Yes 132		83.02

Are non-firefighting citizens able to accurately judge whether a driveway is adequate for firefighting access? Maybe a better question to ask after reading the replies is; could a fire engine turn around in your driveway? Another valid question would be; how long is your driveway? Firefighters will not normally pull into a driveway forward but will back the fire engine in to provide a rapid exit if fire conditions force them to leave quickly. Several of the homes will be serviced by the street due to the location of the driveway or lack thereof. Some homes can only be accessed by an easement road.

Question Thirteen:

Do you have 6-inch reflective house numbers prominently displayed on your house and at your driveway entrance?

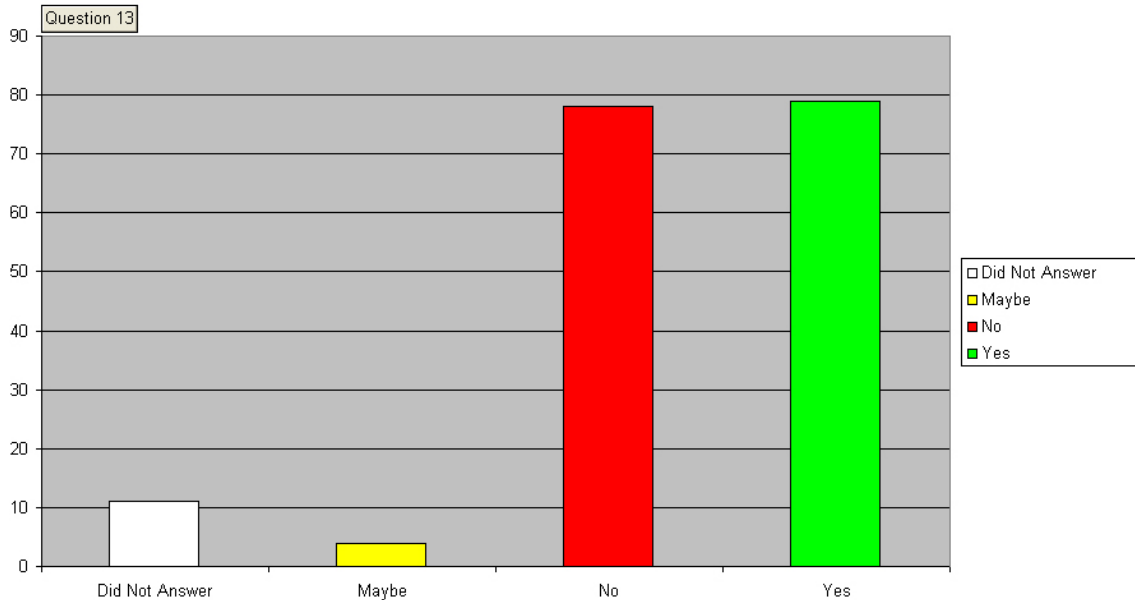


Chart 13: Survey Question Number Thirteen

Table 13: Statistics for Question Thirteen

Replies Number		Percent
Did Not Answer	11	6.40
Maybe 4		2.33
No 78		45.35
Yes 79		45.93

Almost half of those that replied have their addresses posted on their house. This is very encouraging! Some of residents that replied negatively may only have the address posted on the house or driveway but not both. The house-by-house wildland fire home survey, found within this plan, indicates which homes do not have their address posted. After performing the home surveys, several of the homes have addresses but it would take several minutes of searching before they can be found. For example, some addresses are on small signs found on trees, some are painted the same color as the home, and some are located behind trees or brush. Sadly, some are nowhere to be found.

Question Fourteen:

Have you assessed your property for wildfire hazards such as cedar shake roofing, eaves not enclosed, decking not enclosed underneath, dried debris on your roof, wood piles too close to a structure and a 30 foot clearing from all structures of ground and ladder fuels?

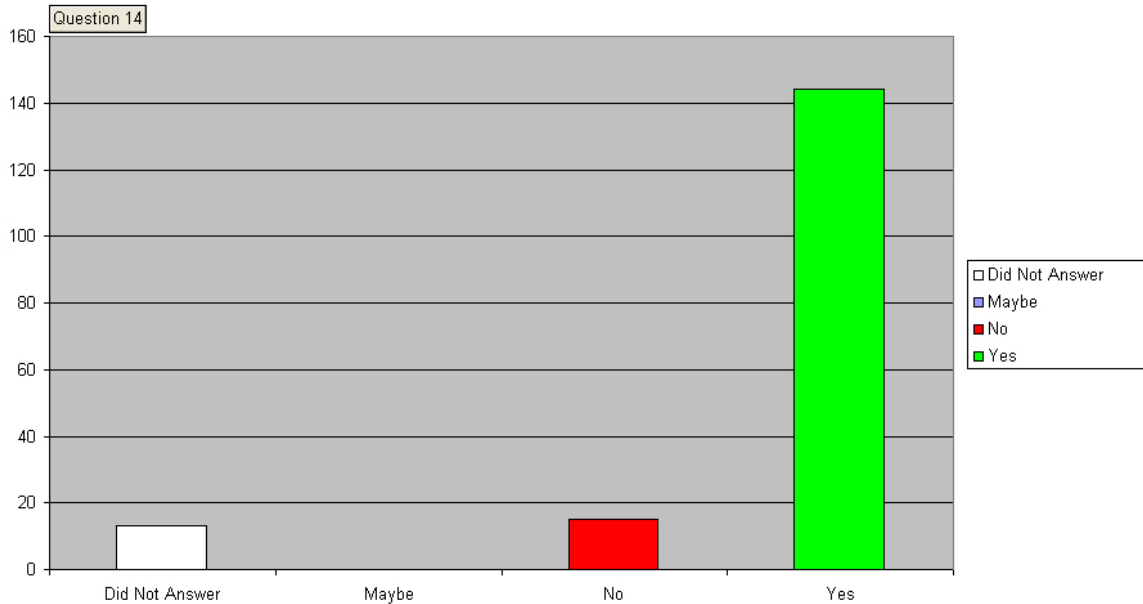


Chart 14: Survey Question Number Fourteen

Table 14: Statistics for Question Fourteen

Replies	Number	Percent
Did Not Answer	13	7.56
Maybe	0	0.00
No	15	8.72
Yes	144	83.72

Over eighty percent of those surveyed have assessed their property for wildfire hazards. What would be a great fact to know is what they thought of their homes likelihood of surviving a wildfire. The house-by-house wildland fire home survey assessed some of this data to compare the survey responses to reality. Several residents stated how difficult it was to obtain insurance. Others stated how much insurance cost. This is most likely based on the fact that more and more insurance companies are assessing areas for wildfire hazards. Factors such as slope, fuel type, and travel time from a fire station are use to set policy rates or even cancel insurance premiums.

Question Fifteen:

How concerned are you that a wildfire could change your quality of life?

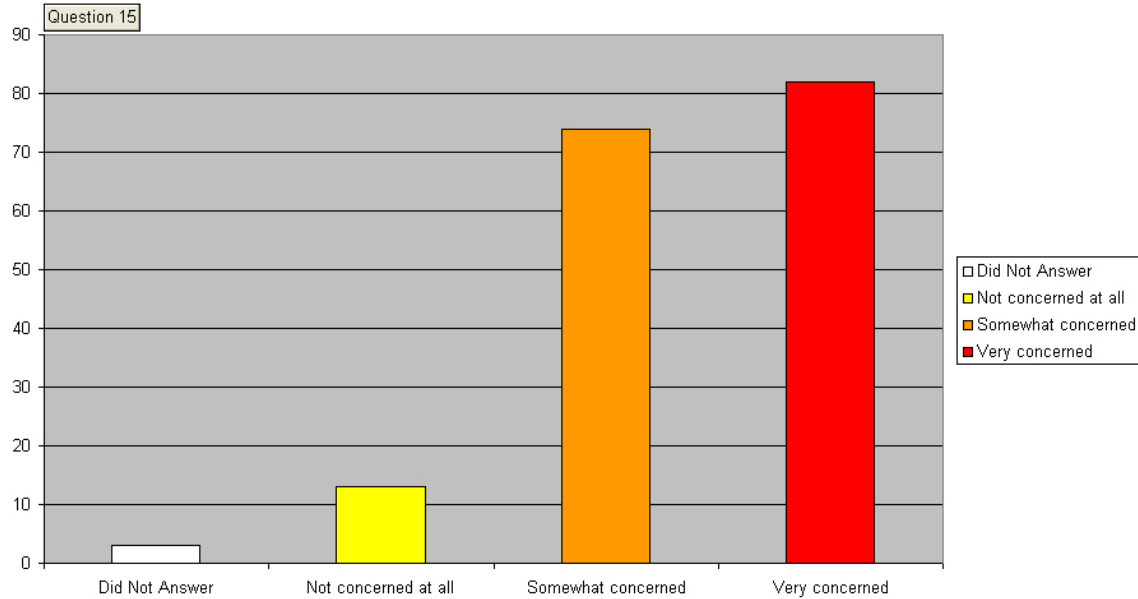


Chart 15: Survey Question Number Fifteen

Table 15: Statistics for Question Fifteen

Replies Number		Percent
Did Not Answer	3	1.74
Not concerned at all	13	7.56
Somewhat concerned	74	43.02
Very concerned	82	47.67

Over forty percent of those surveyed are somewhat concerned that a fire could change the quality of their lives. Almost half of the residents are very concerned that a wildfire may change their lives. The response is most likely proportional to the amount of time the resident uses their home. Those that are not concerned at all most likely have a vacant lot or do not use their home.

Question Sixteen:

Would you support lot clean up days or fuel reduction projects in your area?

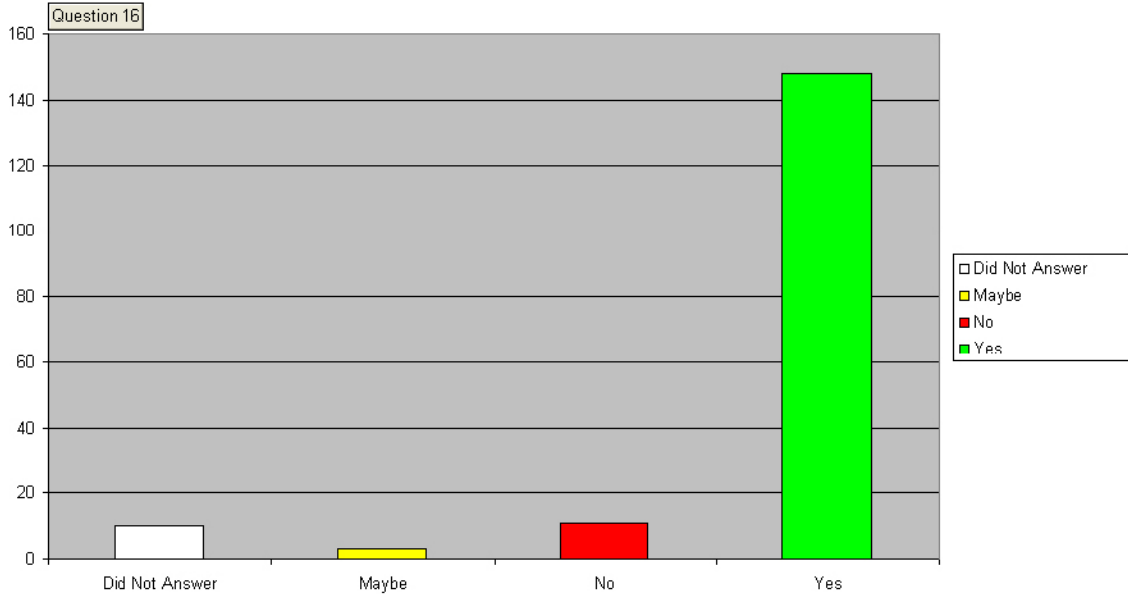


Chart 16: Survey Question Number Sixteen

Table 16: Statistics for Question Sixteen

Replies Number		Percent
Did Not Answer	10	5.81
Maybe 3		1.74
No 11		0.06
Yes 148		86.05

A large majority of the people surveyed support lot clean-up days or fuel reduction projects. Those that would not support fuel reduction projects may assume that the word “support” means some form of financial obligation. During the Memorial Day weekend, several homeowners were cleaning the needles from around their dwellings. The property owners association provides dumpsters at Kaweah Park for residents to deposit needles and other woody debris. As witnessed during the Memorial Day Weekend, this is a very successful program.

Fire Behavior

Fire behavior is how fast and intense a fire spreads. Numerous components of fire behavior can make this simple definition much more complex. A simple understanding is necessary for this assessment. Fire needs heat, fuel, and oxygen existing simultaneously known as the fire triangle. If any one of the components are removed, the fire will go out.



Figure 4: The Fire Behavior Triangle

Fuel is the live and dead vegetation and sometimes structures that feed a wildfire. A fuelbreak removes fuel from the fire triangle while prescribe burns reduce the amount of available fuels. Heat sources can be a lightning strike, an abandoned campfire, or overheated brakes. Once ignited, the fire will produce enough heat to continue to burn unless cooled by water or fire retardant. Oxygen exists in ambient air and is added in greater quantities with wind. This component of the fire triangle is impossible to remove from a wildland fire.

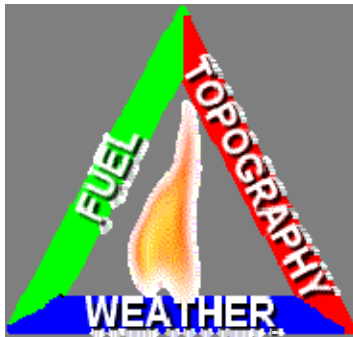


Figure 5: Fire Environment Triangle

If the three components of the fire triangle exist and a fire occurs, three main factors determine how fast and intense the fire will burn. The three factors that comprise the fire environment triangle are fuels, topography, and weather.

Similar to the fire triangle, fuel is the vegetation that is consumed by a wildfire. Vegetation, such as annual grass, can burn fast with moderate intensity. On the other hand, large trees and brush can burn hot enough to melt metal and cast burning embers over a half mile in front of the fire.

Topography is the lay of the land. Topographical features such as river drainages can funnel wind causing an increase in speed. Slope or the amount of vertical rise compared to horizontal distance is another factor that influences how fast a fire will spread. It also restricts where fire engines, bulldozers, and firefighters can travel.

Weather is the biggest element of the fire environment triangle relating to fire behavior. Fuel and topography exist everywhere and in some places, they do not experience the wildfire problems associated with areas that are hot, dry and windy. When some vegetation becomes very dry due to arid conditions, it produces resins to conserve what little water it can transpire. These resins are very flammable and when coupled with wind, more oxygen is added to the fire resulting in faster up and downhill rates of fire spread. Wind also causes burning embers to land in front of a fast moving fire, called spotfires.

The Fire Problem

Alta Sierra is comparable to a powder keg waiting for a match to ignite the fuse for disaster. Using the components of the Fire Environment Triangle, a fire behavior and prediction model can be built to validate this statement. Alta Sierra experiences a unique weather pattern, poses very serious topographic challenges, and has very decadent and heavy fuel loading. Within this fire environment is approximately 350 privately owned dwellings and commercial structures.

Fire Weather

The basic components of fire weather are temperature, humidity, wind speed and the wind direction. Weather is a very dynamic phenomena and even more diverse in mountain terrain. Slope heating can change temperatures, humidity, wind flow, and speeds. Fire Family Plus, a fire weather analysis software program, will allow severe fire weather indices to be defined.

Temperature

Temperature is a measurement of warmth. It is dictated by several factors but mostly the amount of solar radiation that reaches the earth's surface. Cloud cover and wind can alter temperature significantly.

In Alta Sierra, temperature is reactive to two sources of active warming. Located in the Sierra, it is sandwiched between the San Joaquin Valley to the west and the Mojave Desert in the east. Both areas are subject to very high daytime temperatures that influence heating on the mountain.

Fire weather is normally defined in the 90th and 97th percentile worst recorded conditions. Another way to define this is the worst 10 and 3 percent fire weather days. The closest fire weather station found on the nationally archived fire weather data is located on Highway 155 between Wofford Heights and Alta Sierra at the cattle guard. This weather station is located at approximately 4000 feet elevation and is referred to as the Bakersfield Portable Remote Automated Weather Station (RAWS). Another fire weather station is located in Kernville at 2720 feet. Alta Sierra will be cooler with higher humidity than either of these locations. It should be recognized that these areas are representative for the conditions affecting fuel below Alta Sierra. This area has the greatest probability for ignition of a human caused fire due to the fuel loading and population density.

Weather data are provided for the Kernville and Bakersfield Portable RAWS to understand how many days meet these critical fire behavior indices. Data were used from 1961-2003 for the Kernville RAWS but the Bakersfield Portable RAWS has only been in place from 1998-2003. Therefore, the number of days meeting a specific weather index will be much lower for this weather station.

Table 17: Maximum Temperatures. Kernville and the Bakersfield Potable Weather Station:

90th Percentile Max. Temp Kernville/Days Met	90th Percentile Max. Temp Bakersfield Portable	97th Percentile Temp Kernville	97th Percentile Max. Temp Bakersfield Portable
102° F	100°	105° F	104°

Table 18: Number of Days meeting Maximum Temperature Criteria: Kernville Weather Station: 1961-2003

Month	May	June	July	August		Sept.
Days Met 90th Percentile		7 39	158	173		35
Days Met 97th Percentile		2 8 59	56	2		

Table 19: Number of Days meeting Maximum Temperature Criteria: Bakersfield Portable Weather Station: 1998-2003

Month	May	June	July	August		Sept.	Oct.
Days Met 90th Percentile		3 7 42	34	12			1
Days Met 97th Percentile		1 2 12	9	0			0

Relative Humidity

Relative humidity (RH) is a measure of the amount of water in the air compared with the amount of water the air can hold at a given temperature when measured. In firefighter terms, it is how dry the air and more importantly, how dry the vegetation or fuel is. Short-term changes (daily) in RH will dictate how quickly fine fuels such as grass will burn. Long-term changes (monthly) in RH will dictate how quickly larger fuels such as logs will burn.

The RH in Alta Sierra is generally always higher than Kernville. This is due to higher elevations resulting in lower temperatures combined with canopy shading from trees. It is safe to assume that the RH in Alta Sierra is generally at or below 20 percent based on the readings at Kernville during peak daytime heating. RH below 30 percent results in vegetation that will ignite and allow wildland fires to burn. At 20 percent, fire will burn with high intensities and rates of spread. Below 15 percent RH, fires will burn with such high intensities that they will cast embers well ahead of the main fire front, travel through the crowns of trees, and become very difficult to suppress.

Table 20: Minimum Relative Humidity for Kernville: 1961-2003.

90th Percentile Minimum RH Kernville	90th Percentile Minimum RH Bakersfield Portable	97th Percentile Minimum RH Kernville	90th Percentile Minimum RH Bakersfield Portable
9 percent	8 percent	7 percent	5 percent

Table 21: Number of Days meeting Minimum Relative Humidity Criteria: 1961-2003 from the Kernville Fire Weather Station

Month	May	June	July	August	Sept.			Oct.	Nov.
Days Met 90th Percentile of 9 %	30	46	37	59	60	62			33
Days Met 97th Percentile of 7%	13	12	10	17	28	33			15

Table 22: Number of Days meeting Minimum Relative Humidity Criteria: 1998-2003 from the Bakersfield Portable Fire Weather Station

Month	June	July	August		September	October
Days Met 90th Percentile of 8 %	46	37	59	60	62	
Days Met 97th Percentile of 5%	12	10	17	28	33	

Wind

Wind has the largest effect concerning fire behavior. The stronger the wind, the faster a fire will spread. As mentioned earlier, wind also adds more oxygen to the fire resulting in higher intensities. Wind bends the flames closer to the vegetation preheating the fuel closer to its ignition temperature. Lastly, wind causes embers to travel in front of the main fire. These embers land starting new ignitions called spotfires. Spotfires can pull the main fire forward increasing the rate of spread and growth exponentially.

Alta Sierra wind conditions pose a dilemma for fire behavior. In the Northern Hemisphere, the predominate wind blows from the west. This western air flow is combined with another major factor contributing to wind speed and direction which is slope heating. When the face of a slope is warmed, air currents flow up the canyons and slopes. This effect is quite dramatic when the area is as large as the San Joaquin Valley. The warm air in the Valley travels up slope and spills

through the saddle located at the Greenhorn Summit. This effect also occurs when a low pressure system moves over the San Joaquin Valley causing cold air to flow down slope. This creates a downhill daytime wind that is not normally found in most parts of the state.

Compounding this wind condition is the local slope heating within the Kern River Valley. As the east facing slopes warm during the morning exposure to sun, the rising air creates an upslope and upcanyon wind flow. Typically, by 9 o'clock in the morning, the west winds begins to switch to an east or southeast wind lasting until the early afternoon. Please see Figure 6 to visualize the wind patterns.

The worst-case scenario would be a wildfire ignited low in the Shirley Creek Drainage while the wind is blowing downslope. The fire would become fuel and slope driven creating a strong upslope superheated airflow. The upcanyon body of air would meet the downslope winds causing opposing wind currents. Opposing winds are the basic component for fire whirl development. Fire whirls are an tornadic phenomena that creates spinning columns of flame. They can reach over a hundred feet in height, uproot trees, and cast embers well ahead of the main fire.

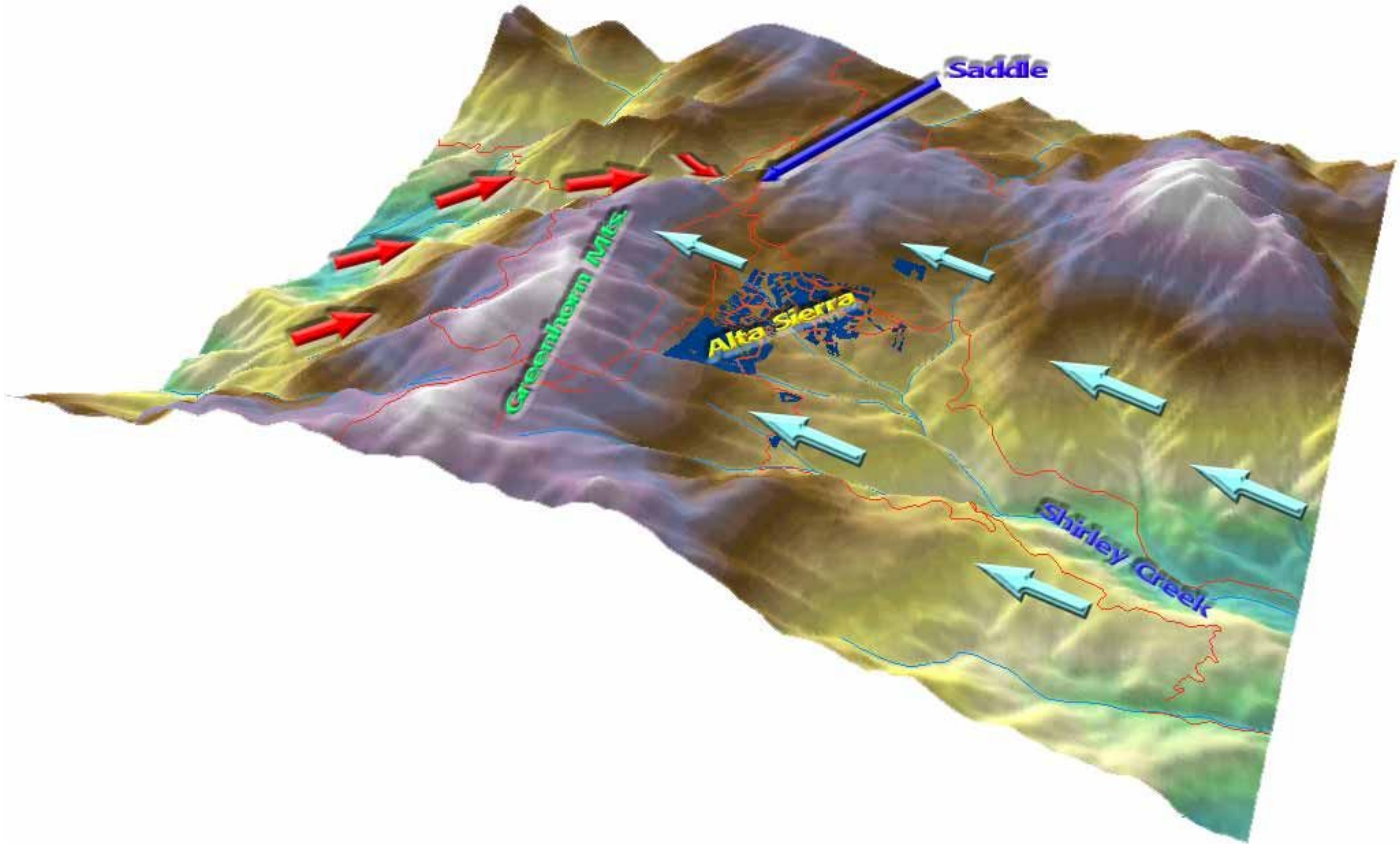


Figure 6: A three dimensional model displays the wind patterns found in Alta Sierra. The red arrows indicate the predominate west winds combined with slope heating on the backside or west facing slopes of the Greenhorn Mountains. As the day continues to warm, by late afternoon the wind finds the path of least resistance and spills through the saddle. The light blue arrow displays the upslope winds flowing up the Shirley Creek Drainage. The blue arrow indicate the wind flow between 09:00 hours and 16:00 hours.

Three Dimensional Model by Timothy Walsh

To document the daily wind cycle, data from Bakersfield³ Portable RAWS is analyzed.

³ The Bakersfield Portable RAWS is located where the Sequoia National Forest and Wofford Heights meet on Highway 155 near the cattle guard.

Table 23: Wind data from the Bakersfield Portable RAWS shows the daily wind shift in yellow. A west wind would equate to a down canyon flow. At approximately 09:00 hours, the wind shifts to a southeast or east flow. Winds from the east would be blowing up the Shirley Drainage. By approximately 16:00, the winds shift back to the predominate western direction. Although this seven-day period is just a snapshot in time, this pattern repeats itself constantly during fire season. Data from July 2003.

Time	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul		
0	2 /W	1 /N	4 /W	3 /W	2 /W	3 /W	5 /W		
1	2 /W	2 /W	3 /W	2 /W	1 /NE	4 /W	0		
2	3 /W	3 /W	3 /W	3 /W	2 /W	2 /W	3 /W		
3	2 /W	2 /W	3 /W	3 /W	1 /W	0	2 /W		
4	3 /W	2 /W	3 /W	5 /W	0	3 /W	3 /W		
5	3 /W	2 /W	4 /W	3 /W	3 /W	7 /W	2 /W		
6	4 /W	-	3 /W	3 /W	4 /W	1 /SW	2 /W		
7	3 /W	3 /W	3 /W	3 /W	2 /W	2 /W	2 /W		
8	0	0	0	1 /W	2 /W	2 /W	0		
9	1 /SE	1 /E	1 /S	1 /SE	1 /S	0	0		
10	2 /E	1 /E	1 /E	1 /E	1 /SE	2 /S	1 /N		
11	2 /SE	2 /SE	1 /E	2 /SE	1 /SE	1 /E	3 /SW		
12	2 /E	2 /E	2 /S	2 /SE	2 /SE	2 /E	0		
13	5 /W	2 /E	2 /E	2 /E	2 /E	2 /SE	2 /SE		
14	7 /W	6 /W	3 /E	2 /SE	8 /W	2 /W	2 /SE		
15	6 /W	8 /W	1 /SW	7 /W	8 /W	4 /SW	1 /SE		
16	8 /W	7 /W	4 /SW	7 /W	8 /W	7 /W	4 /N		
17	5 /W	6 /W	8 /W	8 /W	6 /W	8 /W	4 /W		
18	5 /W	5 /W	8 /SW	6 /W	7 /W	7 /W	1 /SE		
19	6 /W	6 /W	2 /NW	7 /W	3 /SW	7 /W	5 /W		
20	4 /W	5 /W	0	8 /W	1 /N	6 /W	0		
21	2 /W	5 /W	1 /W	9 /W	1 /NW	3 /W	0		
22	3 /NW	5 /W	2 /W	3 /W	0	1 /W	2 /W		
23	5 /W	2 /W	3 /W	4 /NW	1 /NW	3 /W	5 /W		

Topography

Topography defined is simply the lay of the land. This simple definition unfortunately becomes very convoluted concerning the lay of the land surrounding Alta Sierra. Topographic features alter how a fire can burn. Elevation, slope, aspect, canyons, saddles, and ridges all play a significant role in fire behavior surrounding the mountain community.

Elevation

If Alta Sierra has one positive factor relating to fire behavior, it is elevation. Elevation moderates temperature resulting in higher relative humidity and fuel moistures. On a negative note, elevation also works against the community in the form of slope. There is a 3,000 foot elevation gain from Alta Sierra down to

Lake Isabella in just over 5.5 miles. This rapid rise in elevation results in the steepest state highway found in California. Highway 155 is posted with signs advising 13 percent grades. This steep grade will bring fire suppression resources such as fire engines and bulldozer transports to a crawl as they respond to a fire in the isolated mountainous community.

The elevation at the bottom of Highway 155 near Lake Isabella is approximately 2,650 feet. The elevation of Alta Sierra is approximately 5,800 feet. The elevation of the Greenhorn Mountains is approximately 6,800-7,000 feet. The middle elevation of a mountain is referred to as the thermal belt. It is called the thermal belt because at night, cool air pools in lower elevations. When this occurs, a warmer band of air is trapped between two cooler bands forming an inversion layer.

Within the thermal belt, nighttime temperatures are higher and humidity remains lower. This results in corresponding areas of lower overall fuel moisture. Fire activity can transition from a fire with very little activity to one that will actively burn when it moves into the thermal belt. The good news is that Alta Sierra is not located in the thermal belt. The bad news is that it is located directly above it. Fire activity may continue to burn with higher intensity and rates of spread toward the community. Alta Sierra is sandwiched between two thermal belts located in the area between the lake and the summit and also the backside of the Greenhorn Mountains. Please see Map 1 Elevation Model and Map 2 Thermal Belt Models.

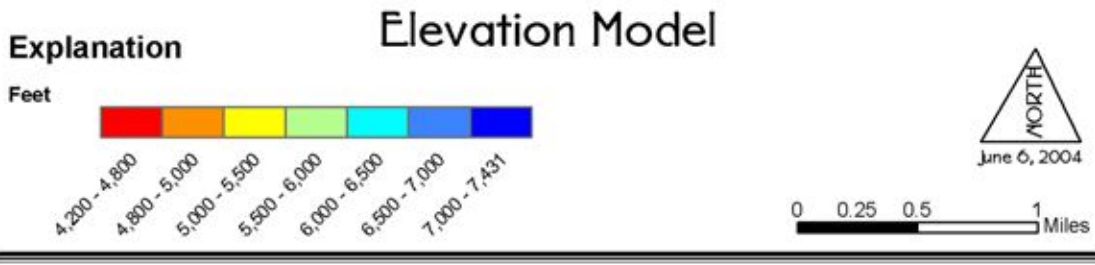
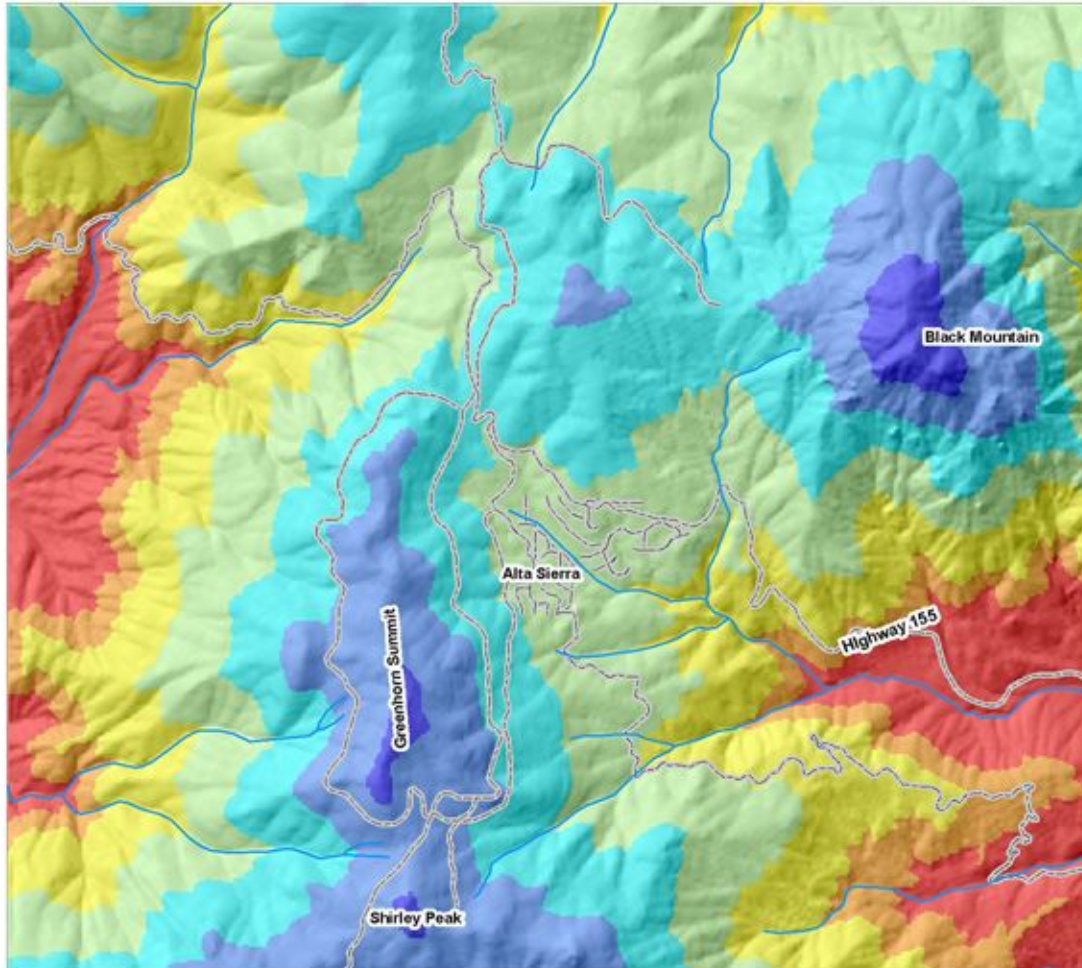
Slope

Slope is the amount of elevation change compared to a horizontal distance. The greater the change in elevation, the steeper the slope. The effects of slope on responding fire equipment has been discussed. Slope also poses other negative aspects concerning fire behavior. On a mountain, the steeper the slope, the faster fire will burn. Flames are closer to the vegetation resulting in preheating. In flashy fuel types, like grass and sagebrush, this preheating can result in area ignition. Area ignition is the result of preheated areas and numerous upslope spotfires caused by ember casting. The separate spotfires will influence each other while they all burn together consuming great volumes of vegetation. This is an extremely dangerous phenomenon.

Slope also allows burning materials to roll downhill. Rolling pinecones and logs are notorious for spreading fire downslope. Several fuelbreaks have been compromised from rolling material. Burning rolling material can also ignite needles or other materials stored under the decks of homes.

Map By:
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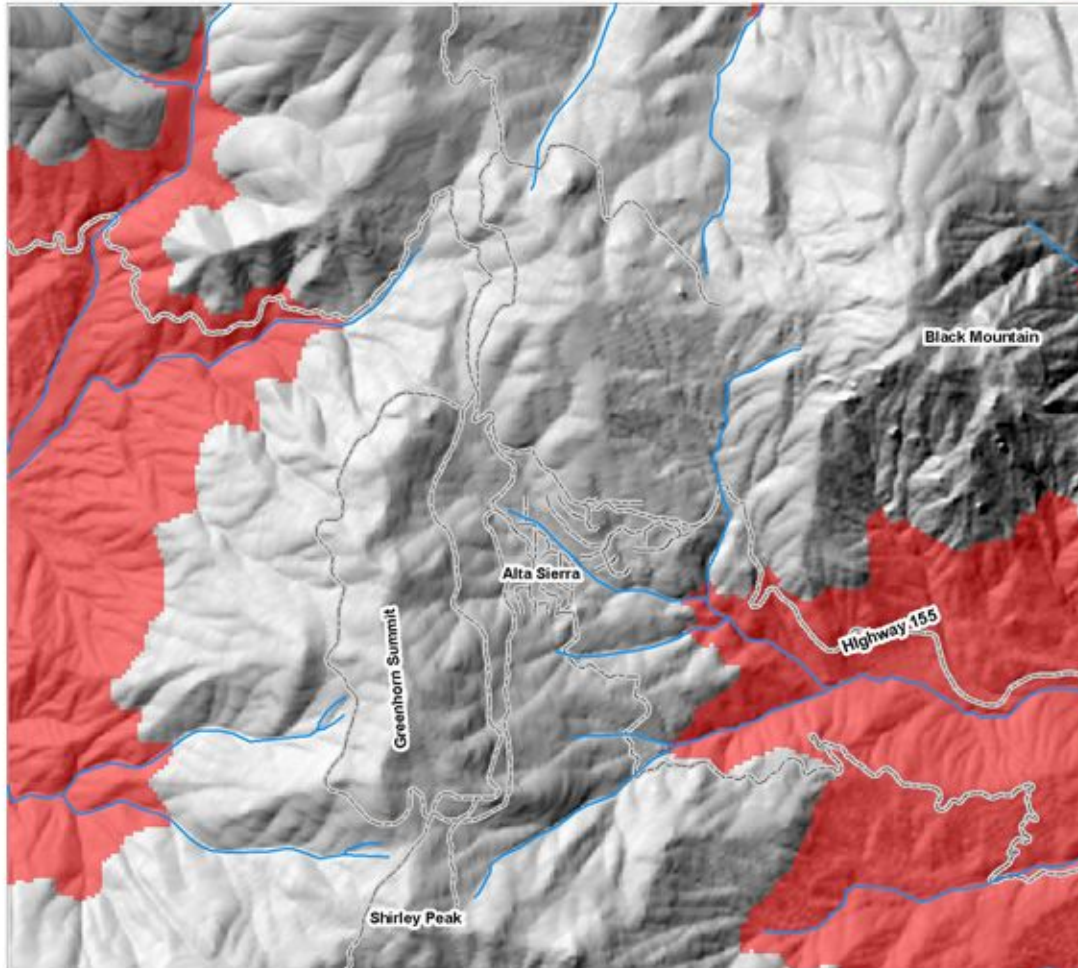
Alta Sierra Community Fire Safe Plan



Map 1: Elevation Model Map

Map By:
Timothy Walsh
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(707) 206-0723


Alta Sierra Community Fire Safe Plan



Thermal Belt Model

Explanation

Middle Third of Slope

 Thermal Belt



Map 2: Thermal Belt Model Map indicates that Alta Sierra is sandwiched between two thermal belts located on either side of the Greenhorn Summit.

There are rules of thumb for rates of spread of fire relating to slope. On a slope of five percent or less, there is not much influence. As the slope reaches 30 percent, the rate of spread will double. A fire burning at 10 feet per minute on a 5 percent slope will burn 20 feet per minute on a 30 percent slope. As the slope reaches 55 percent, the rate of spread will double again. The fire that was burning at 20 feet per minute is now burning at 40 feet per minute. A rate of fire spread of 40 feet per minute equates to over 6 inches per second!

The slopes below Alta Sierra are extremely steep. They range from 25 to 75 percent. Within the study area surrounding Alta Sierra, slopes of over 100 percent⁴ are common. Four-wheel drive fire engines can usually traverse up to a 40 percent slope. Bulldozers can usually traverse up to a 60 percent slope. Please see Map 3 for the Alta Sierra Slope Model.

Aspect

Aspect is the direction the slope faces. As the sun moves through the sky during the day, it strikes some aspects longer than others. The southwest aspect receives the most solar heating through the course of the day followed closely by the south and west aspects. Vegetation on these slopes are dryer due to higher temperatures and lower humidity.

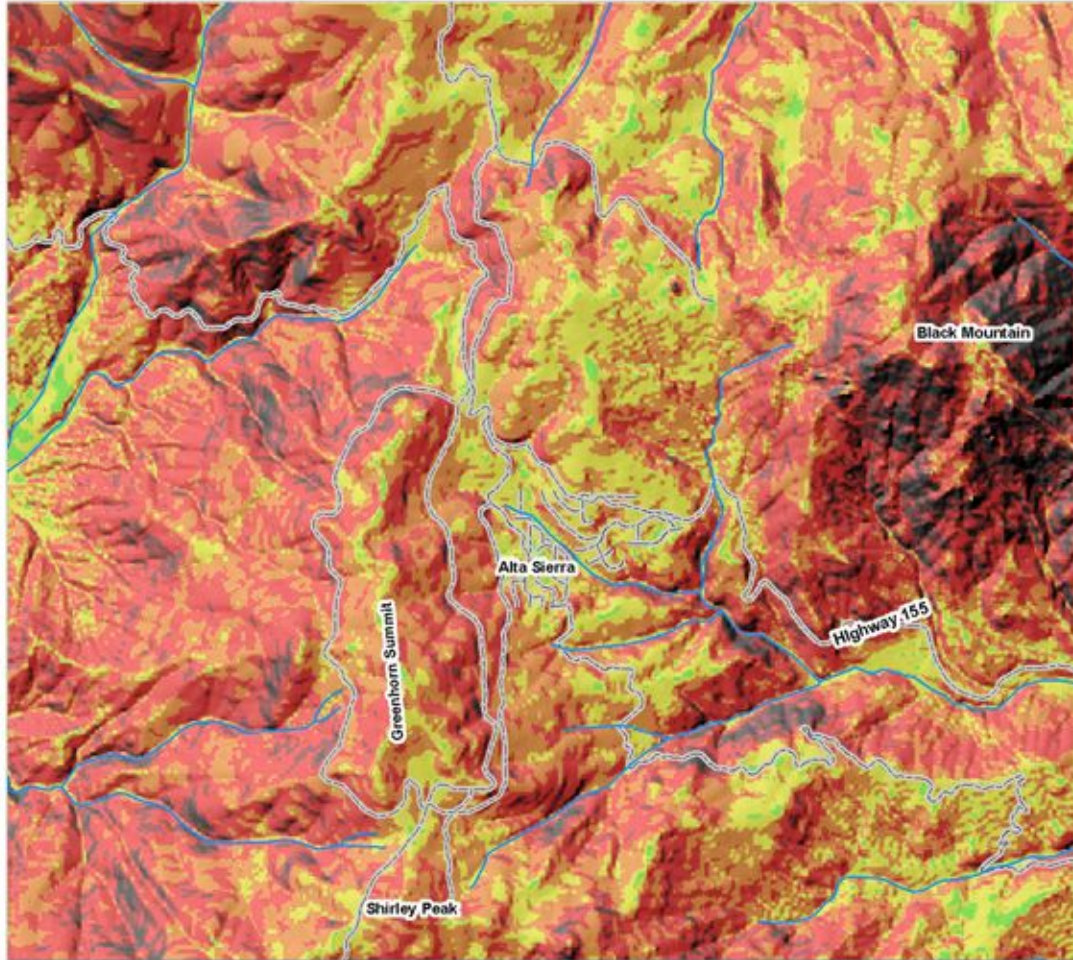
These dryer conditions also dictate fuel types and fuel conditions found on different slopes. The southern slopes normally have a high concentration of flashy fuels such as grass and sagebrush. The northern slopes normally have heavier concentrations of coniferous fuels with very high fuel loadings. With the higher fuel moistures and fuel loading, fires burning on northern slopes generally burn slower but with higher intensity.

Alta Sierra is nearly evenly divided by hot slopes and cold slopes. Ice House Creek divides the community. Those homes situated north of the creek are situated on the warmer south-southwest facing slopes. This includes homes off of Alta Sierra Road, Elm Drive, Laurel Drive, Pinecone Court, Jay Way, Ponderosa Drive, Mooncrest Drive, Lotus Drive and Charlott Drive. A majority of the aspects south of the creek are cooler northern aspects. This includes homes off of Old State Road, Pine Drive, Juniper Road, Spruce Drive, Fir Drive, Conifer Lane, and Oak Drive. Please see Map 4 for Alta Sierra Aspect Model.

⁴When the slope angle equals 45 degrees, the rise is equal to the run. Expressed as a percentage, the slope of this angle is 100 percent. Note that as the slope approaches vertical (90°), the percentage slope approaches infinity.

Map By:
Timothy Walsh
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Alta Sierra Community Fire Safe Plan



Slope Model

Explanation

Percent



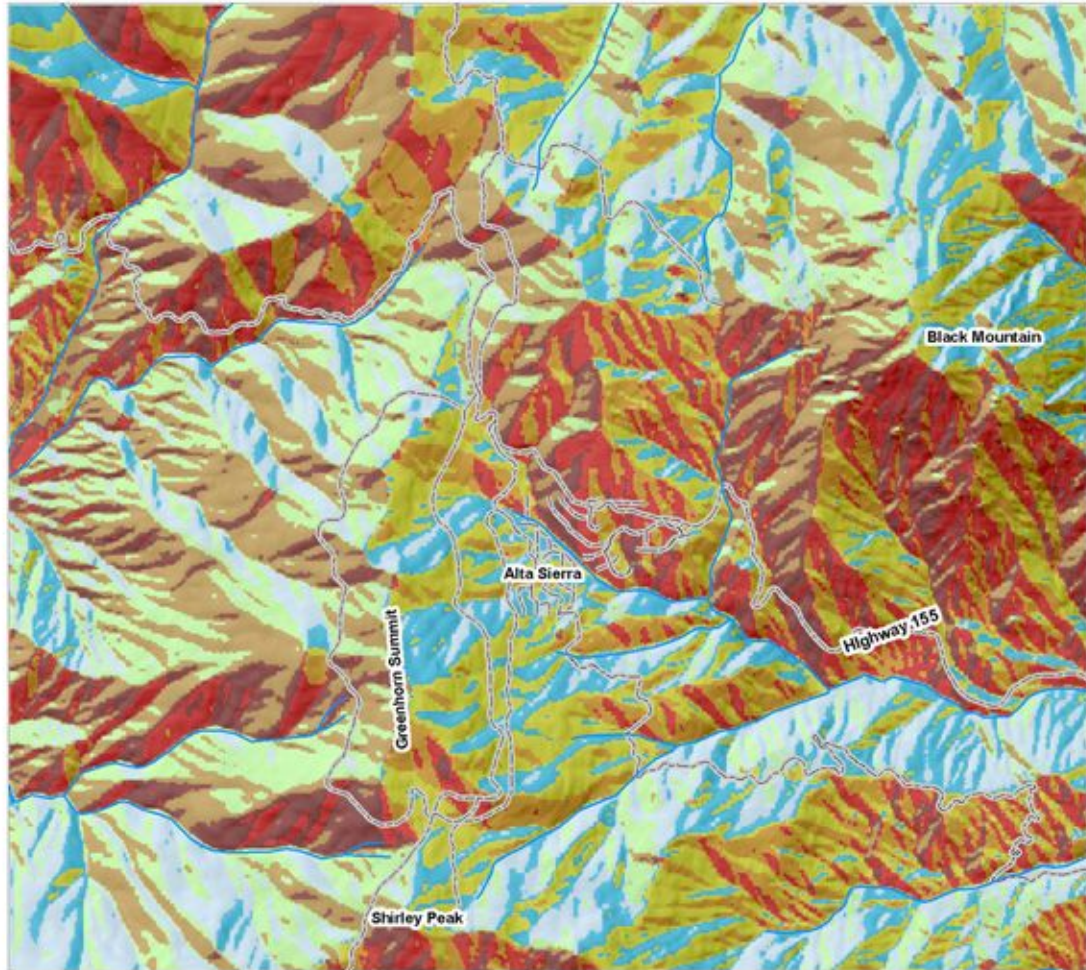
June 6, 2004



Map 3: Slope Model Map

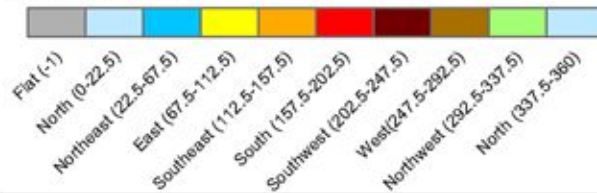
Map By:
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Alta Sierra Community Fire Safe Plan



Explanation

Direction Slope Faces



Aspect Model



June 7, 2004



Map 4: Aspect Model Map displays the slopes that receive the most solar radiation in the warm colors.

Canyon, Saddles, and Ridges

As seen in the previous maps, there are several canyons, saddles, and ridges surrounding Alta Sierra. These topographic features will significantly affect fire behavior. The Shirley Creek, Ice House and smaller unnamed drainages will funnel wind upslope during the day. The narrower the canyon, the greater increase in wind speed due to the Venturi Effect⁵. Narrow canyons can also aid in the spread of fire due to radiant heat transfer. Intense heat on one side of the canyon may ignite vegetation on the other side. Narrow canyons and the ridgeline of the Greenhorn Mountains also cause winds to eddy. Eddies cause the wind to swirl and blow in several different directions. All of the topographic features surrounding Alta Sierra pose serious concerns relating to fire behavior.



Figure 7: Looking west up the Shirley Creek Drainage shows the canyons, saddles and ridges that will significantly influence a fire burning toward Alta Sierra. The Greenhorn Mountains are in the background. Photograph by Timothy Walsh

⁵ The Venturi Effect is the speeding up of air, or another fluid, as it passes through a constriction.

Fuel

Fuel is the vegetation that is consumed by a wildland fire. The fuel type and configuration determines how much heat is generated and how quickly an area will burn. The two broad classifications of fuel are light and heavy. As one travels west from Lake Isabella up Highway 155, most fuel types and configurations are experienced.



Figure 8: This cross section of aerial photographs shows the light flashy fuel types found at the bottom of the hill where Highway 155 meets Wofford Blvd. The photos are orientated west (upper left) to east (lower right). The fuels begin to transition from grass to stands of sagebrush. The riparian areas (creek bottoms) shown in bright green host hardwood species.



Figure 9: This cross section of aerial photographs shows the transition from light flashy fuels into hard chaparral and in higher elevation, the oak woodland forest. The hard chaparral such as Manzanita and Chamise are dark gray in the photographs. At these elevations, the riparian areas will support coniferous trees. Aerial Photos provided by AirPhoto USA under contract with Kern County.



Figure 10: This cross section of aerial photographs document the last fuel type transition into the heavy coniferous forest found in the upper elevation. Streets in Alta Sierra are visible at the left side of the photo merge. For spatial reference, the reverse “J” is Mooncrest Drive. Aerial Photos provided by AirPhoto USA under contract with Kern County.

Fuels found in Alta Sierra are predominately coniferous trees that in many areas are overstocked. On some of the west facing slopes, brush is quite prevalent. Brush such as Manzanita is highly volatile due to the resins produced by the plant to conserve water during the summer months. Some residents have found the brush attractive enough to use as ornamental vegetation for landscaping. This could prove to be a bad mistake in the event of a wildland fire.



Figure 11: This house located on Ponderosa Drive uses highly flammable Manzanita for ornamental vegetation. Photograph by Timothy Walsh.

Mortality

Over time, fuels can accumulate contributing to the overall fuel load that supports a wildland fire. Areas that have not burned in recent time become overloaded with both live and dead fuels. Live fuels consist of living herbaceous grasses, brush, and trees. Dead fuels consist of cured annual grasses, dead branches suspended in brush, pine needles, and dead decaying branches and logs. Other conditions can also change the fuel loading in an area.

Surrounding Alta Sierra are pockets of conifers that have been attacked by Western Pine Bark Beetle. Several of these pockets can be seen as 5-8 trees with brown needles on them. In this condition, they are particularly hazardous. If a fire burned into these effected areas, the fire will quickly climb up the tree into the crown feeding on the vertically arranged dead pine needles. Once in the crown, the slightest breeze will cause embers to cast several hundred feet in the direction of the wind.

As documented in the San Bernardino National Forest, drought can drastically increase the mortality associated with Bark Beetle infestation. Currently, the



Figure 12: Pockets of Western Pine Bark Beetle mortality are circled in yellow. Rooflines of Alta Sierra are seen in the middle of the group of circles in the photograph. Photograph by: Timothy Walsh

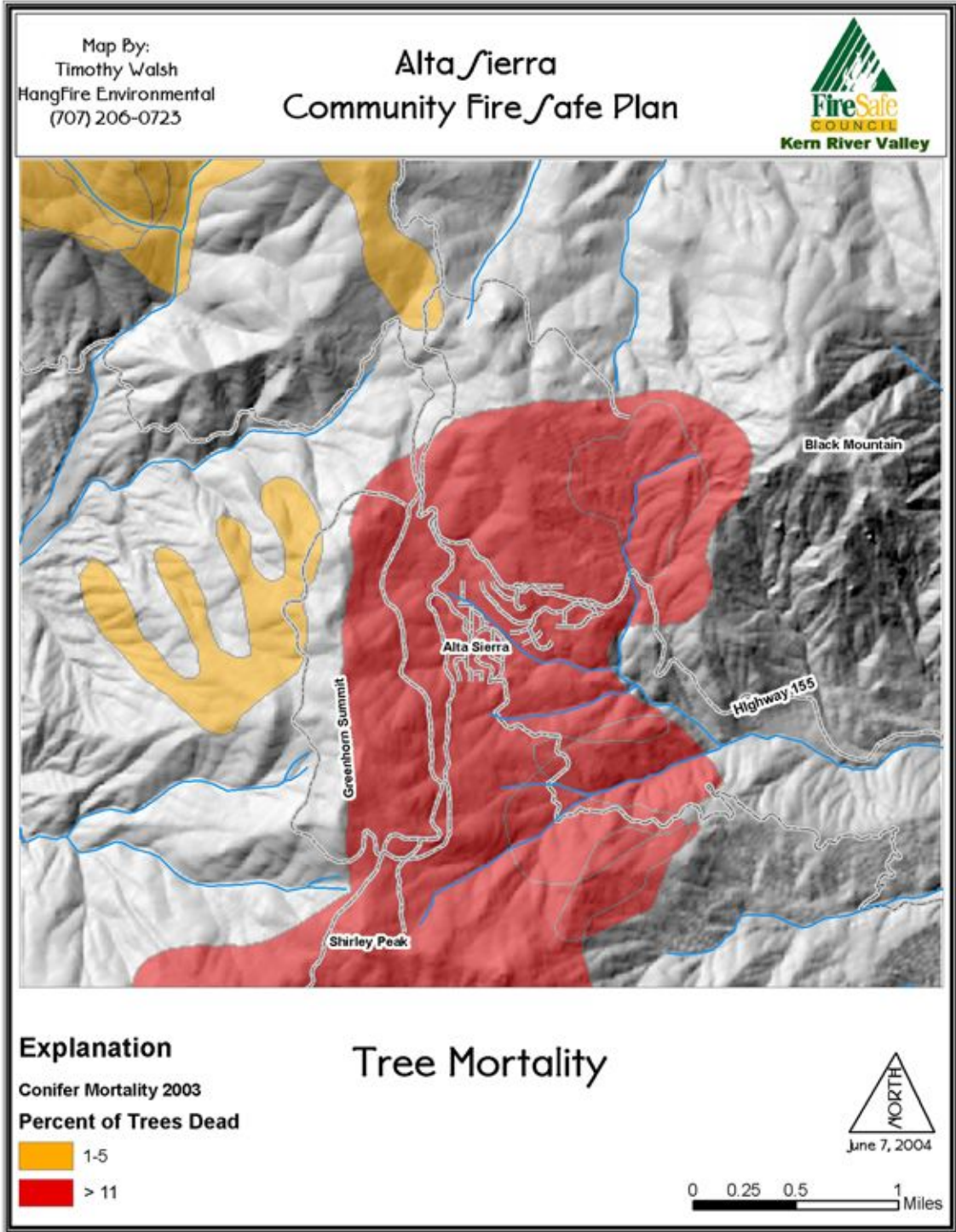
Sequoia National Forest is under a long-term drought. The California Seasonal Fire Weather/Fire Danger Outlook-April 2004 states, "Drought stress on the vegetation has resulted in varying and extensive brush and timber mortality throughout the Angeles, Cleveland, San Bernardino, and Sequoia National Forests and surrounding state and local responsibility areas."

The United States Forest Service⁶ performed an aerial survey in 2003 to map the areas of tree mortality in the Sequoia National Forest. Their data indicate that there is greater than 11 percent mortality within the Alta Sierra forest and community. This equates to over one tree in ten that are either dead or dying. One particular area of the community that is currently being developed for two new homes is suffering the affects of tree mortality. The area of upper Alta Sierra Road, north of Highway 155 has some of the heaviest dead and down vegetation within the entire community surveyed as seen in Figure 13. Please see Map 5 for Alta Sierra tree mortality percentages.



Figure 13: Heavy dead and down fuel loading resulting from bug kill found on Upper Alta Sierra Road. This extremely heavy fuel loading would make a fire burn over a very long time with extreme intensity. These high intensities may result in ineffective fire suppression strategies. Photograph by Timothy Walsh

⁶ U.S.D.A. Forest Service, State & Private Forestry, Forest Health Protection



Map 5: Tree Mortality Map data were produced by the USDA-Forest Service 2003 Aerial Survey.

Fire History

Areas that have little or no history of fire or any other type of vegetation management become overloaded with fuel. With the recent exception of one recorded fire, most of the Alta Sierra area is void of fire history. This may be what has led to the current Western Pine Bark Beetle infestation. Fire is nature's way to thin the forest. When a slow burning fire with little intensity has thinned a forest, trees are not competing for water and nutrients. This process allows for fewer but healthier trees. Healthy trees stand a much better chance of producing pitch that plugs boreholes made by the beetles.

Without fire, the forest has become very unhealthy full of large thickets of small trees and brush. Many areas become choked with vegetation that when a forest fire finally occurs, there is little to do but get out of the way. This is usually not a problem unless there are assets within the fuelbed. Assets such as homes, habitat, and watersheds can suffer devastation from a wildland fire.



Figure 14: At the east end of Pinecone Court looking towards Highway 155, a thicket of small and unsightly Cedar trees along with forest debris can be seen. This grove of trees is the result of years of fire absence. Photograph by Timothy Walsh

The Alta Fire

The Alta Fire burned on June 20th, 1973 with very high intensity. It was approximately 120 acres located south of Alta Sierra proper. The northern portion of the fire is within 2,500 feet of the center of the community. The Alta Fire may be the best case study of what the future may hold unless wildland fire mitigation measures are employed.

The Alta Fire burned in similar elevation, slopes, and weather. The fuel types were similar but now Alta Sierra's fuels are 30 plus years older. This equates to 30 years more of decaying and dying organic material. This also equates to 30 more years of tree growth that will continue to overpopulate the forest.

According to Kern County Fire Department Battalion Chief Ken Stevens, the Alta Fire burned with high intensity with active tree torching and crowning. The fire burned from the Old State Road west crossing Sequoia Drive and Rancheria Road as it reached the summit as seen in Figure 15. The fire cast spotfires ahead of itself taking advantage of the slope and heavy vegetation.



Figure 15: The fire scar from the 1973 Alta Fire is still visible today. It is outlined in red. Aerial Photo provide by Airphoto USA.

Using the Alta Fire as the case study, what would happen if this same small fire occurred to the north? If the fire perimeter is moved over the community, the results are sobering. The fire would affect 173 developed parcels. The assessed valuation of potential damage would be \$10,109,893 based on the assessor's tax records⁷. This estimate is low due to the current increases in housing and construction cost.

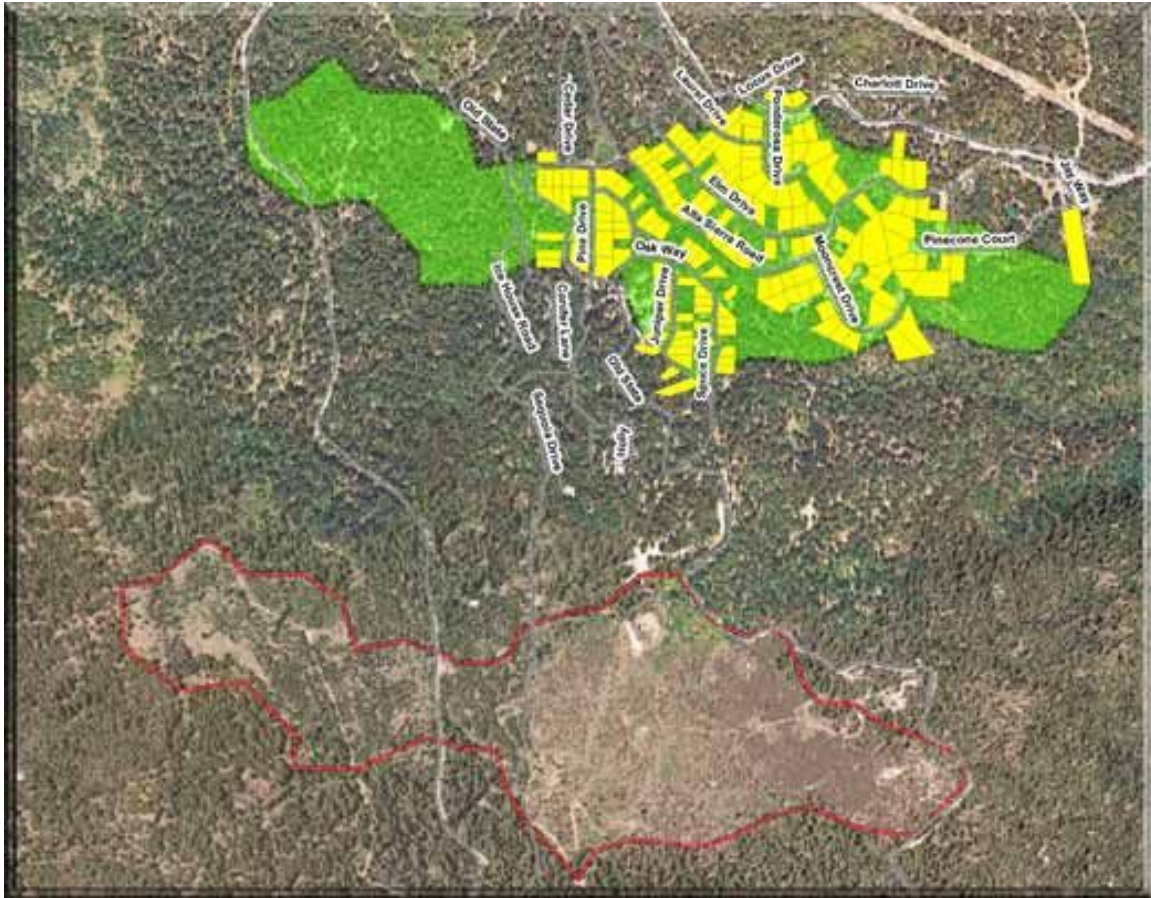
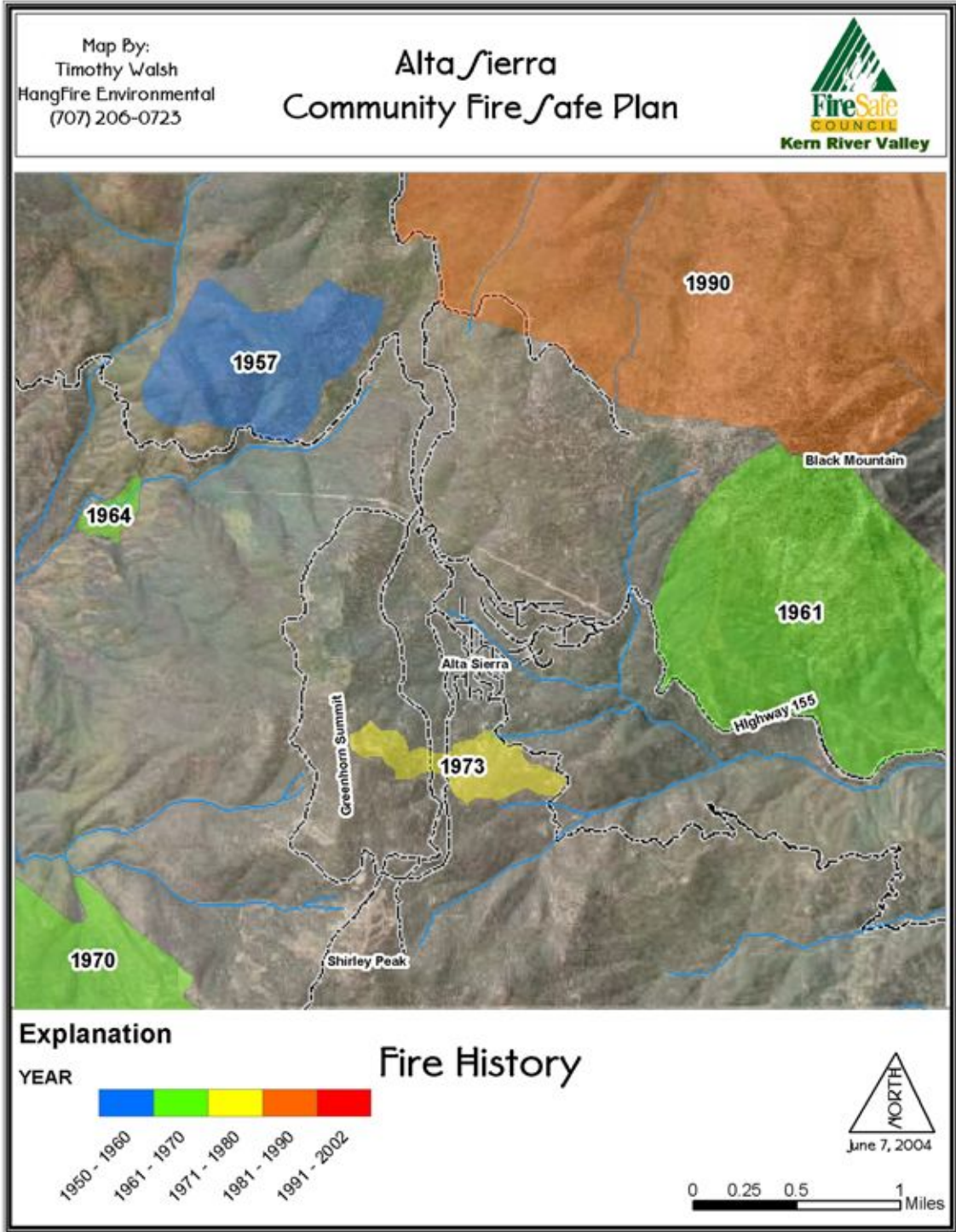


Figure 16: This model depicts how many homes would be affected if the 1973 Alta Fire occurred 3,000 feet to the north. The 173 yellow polygons represent the locations of developed parcels potentially impacted by the fire. The lime green polygon represents the same size and shape of the original Alta Fire seen in red outline. Aerial Photo provided by Airphoto USA.

Other Historical Fires

With the exception of the Alta Fire, the immediate area is absent from large historical fires. The closest fire that threatened the community was the Stormy Fire that occurred on August 5, 1990. The Stormy Fire burned over 9000 acres

⁷ The Assessor's information is based on assessed taxes of improvements on each parcel, not necessarily the replacement value! The minute the data are published, it becomes outdated.



Map 6: Recent Fire History surrounding Alta Sierra.

and burned to within 1 mile of Alta Sierra to the north. Please see Map 6 for recent large fire history.

Fire Potential

To analyze how a fire may spread from an ignition occurring on Highway 155, a fire model is utilized. *FARSITE (Fire Area Simulator)* is a model for spatially and temporally simulating the spread and behavior of fires under conditions of heterogeneous terrain, fuels, and weather. The model needs five inputs: elevation, slope, aspect, fuel type, and canopy characteristics. As the model performs very sophisticated mathematical fire behavior equations, it also exports a perimeter of where the fire will spread. Other fire behavior outputs are also exported including flame lengths, fireline intensity, and rates of spread.

Model Inputs

The elevation model was created from a United States Geologic Survey (USGS) 30-meter digital elevation model (DEM). Slope and aspect were derived from the DEM. The fuel model⁸ layer was created for the Kern River Valley Community Fire Safe Plan using data from the Southern Sierra Geographic Information Cooperative. This layer was refined by members of the Kern River Valley Fire Safe Council making it a more accurate representation of the area. To create a more realistic model, fuel models 4 and 12 were peppered throughout the model of the community. This was done to simulate increased fire behavior caused by non-forest products burning such as plastic tarps, vehicles, and sheds. The model does not have the ability to simulate burning structures. The canopy layer was derived from the fuel layer.

To prevent the model from over predicting, adjustment factors are applied to slow the simulated rates of spread. Fuel models 1, 2, and 4 were slowed by a factor of .5, resulting in half the rates of spread.

The simulated weather mimics the daily occurrence of the morning upslope wind changing to downslope in the early afternoon. This wind reversal is the only reason the simulated fire did not spread through the entire community.

The simulated fire occurs on August 8. It is a hot day reaching 94 degrees with 11 percent relative humidity at the 4,400-foot elevation. The model adjusts fuel moistures based on elevation. Simulated winds were changed every half hour to simulate a pulsing action normally associate with fire spread. Winds were between 4-7 miles per hour (mph) with one gust of 9 mph and one gust of 10 mph.

Model Outputs

The model has the ability to cast spot fires based on fuel type, wind direction, and topography. A spotting tolerance of fifty percent was used. This figure

⁸ A guide to fuel models used in the FARSITE simulation is found in Appendix A-Fuel Model Guide.

represents the percent of embers that land in a receptive fuel bed and will continue to burn. Half of all embers cast by the model were simulated as new fires. This approach was an attempt to mirror reality but is very mathematically computational. The resulting model ran for over 12 hours on a high-end computer.

The modeled fire begins as a third of an acre fire at the hairpin turn located 2,100 feet southeast of the intersection of Jay Way and Pinecone Court. The fire starts at 10:00 in the morning and quickly grows beyond the capability of initial attack fire suppression resources. The fire burns towards Alta Sierra under the daily south-southeast winds that occur during the morning hours. Within the first hour, the fire is 29 acres burning down and cross slope into the Shirley Creek Drainage.



Figure 17: The small red dot next to the hairpin turn is the point of origin for the modeled fire. Aerial Photo provide by Airphoto USA.

Prior to 11:00 a.m., the fire has crossed the drainage and is starting an upslope run towards Alta Sierra.

By 12:00 p.m., the fire has reached the southeastern portions of the community. The fire will impact the homes located on the eastern sections of Pinecone Court and Jay Way.

By 01:00 p.m., the fire has burned into the parcels located on Mooncrest Drive, Crescent Drive, and the eastern portions of Alta

Sierra Drive. Spot fires have landed on the north side of Highway 155 allowing fire to move towards the parcels on Charlott Drive.

By 2:00 p.m., the simulated fire has reached the parcels located on Charlott Drive, Elm Drive, and the southern portion of Ponderosa Drive.

By 3:00 p.m., the fire has continued moving to the west reaching parcels on Spruce Drive, Juniper Road, and Oak Drive. It has spotted over Highway 155 again to the south at the hairpin turn. The upper spot fire that occurred at 1:00 p.m. has reached the single developed parcel on upper Alta Sierra.

By 4:00 p.m., the fire has consumed a large percentage of the parcels located on Elm Drive, Laurel Drive, Lotus Drive, and Alta Sierra Drive. Finally, by 4:30 p.m., the wind has switched to a western flow pushing the fire away from any more

developed parcels. The simulated fire is now moving to the northeast towards Black Mountain.

The modeled fire has burned 202 parcels. If all of the homes were destroyed, it would amount to \$12, 203,461 in improved property damage based on the assessor’s tax records. Replacement cost will be higher due to the increase in construction cost. This figure does not include home contents and vehicles that will be destroyed by a fire.

The model outputs indicate:

Flame Lengths: 1 – 75 Feet
 Fire Line Intensity: 0 - 7281 BTU/Foot/Second
 Rates of Spread: 1 - 144 Feet per Minute

Table 24 shows the simulated fire growth in one-hour increments. Please see Map 7 for modeled fire perimeters.

Table 24: Modeled fire growth over 9 hours.

Elapsed Time Hours	Current Modeled Time	Acres⁹
1	10:00	.33
2	11:00	29
3	12:00	83
4	13:00	189
5	14:00	286
6	15:00	391
7	16:00	546
8	17:00	778
9 18:00		1101

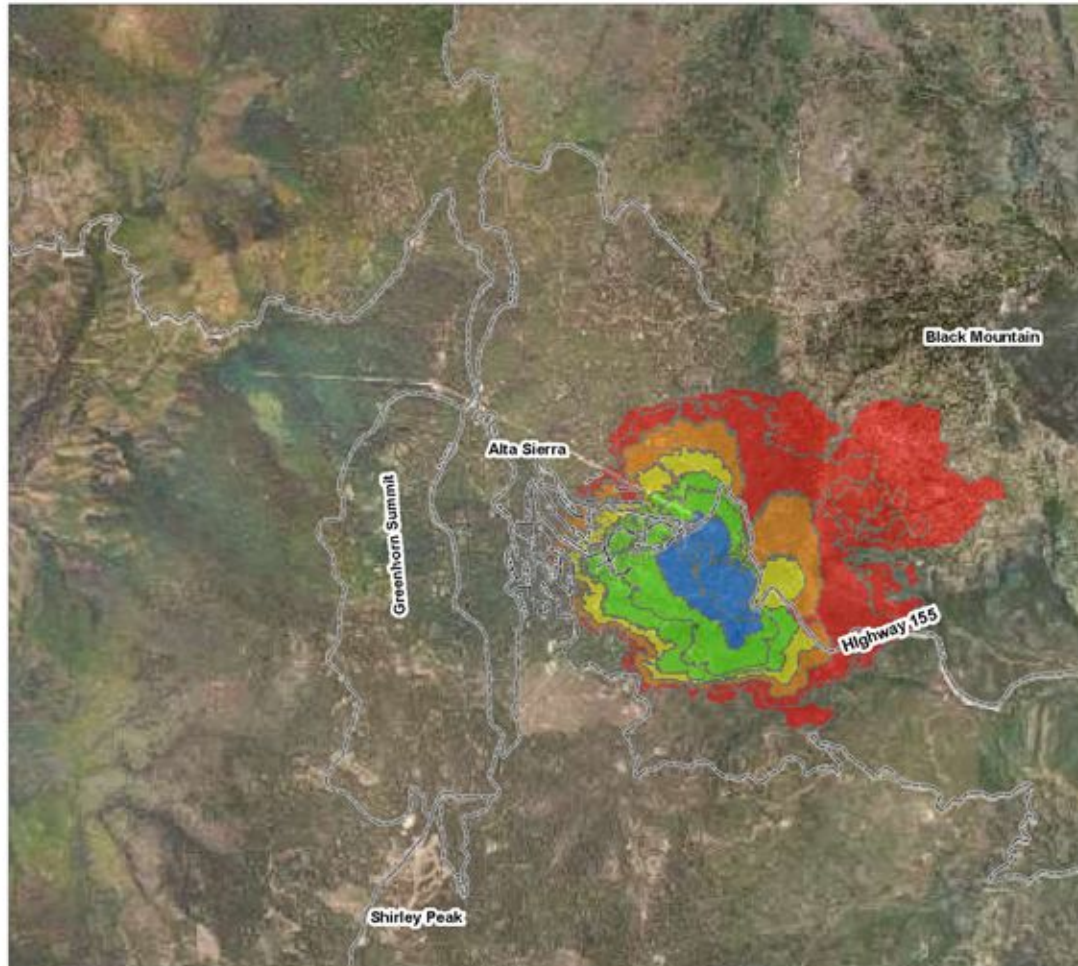


Figure 18: A panorama of the area where the modeled fire would burn. Notice the high number of dead trees in the foreground. Photograph by Timothy Walsh

⁹ This acreage figure assumes that suppression will fail and the fire will continue to grow.

Map By:
Timothy Walsh
HangFire Environmental
(707) 206-0723

Alta Sierra Community Fire Safe Plan

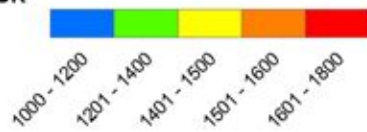


Explanation

Farsite Fire Prediction Model

Farsite Fire Prediction Model

HOUR



June 14, 2004



Map 7: FARSITE Fire Prediction of a fire starting at 10:00 hours and burning until 18:00 hours. The model assumes suppression forces will fail to control the fire during initial attack.

Assets at Risk

The biggest asset at risk throughout the community is private dwellings. The Fire Problem and Potential Fire sections of this plan documents the risk the community faces. Unfortunately, this is only a small part of the risk. The community itself is in dangerous shape concerning wildland fire. A majority of the homes are built with flammable wood siding. The older section of the community, defined as west of Ponderosa Drive has inadequate water supply and very narrow streets.

House-By-House Fire Safe Survey

To quantify the risk, a house-by-house survey was performed. Each home was assessed for roof type, siding material, and whether there was a deck or other opening where fire could be blown under a flammable structural member. For example, some homes did not have a deck, but openings under a porch would allow burning embers an opportunity to ignite debris under the house. The posting of addresses was also documented for each home as well as access.

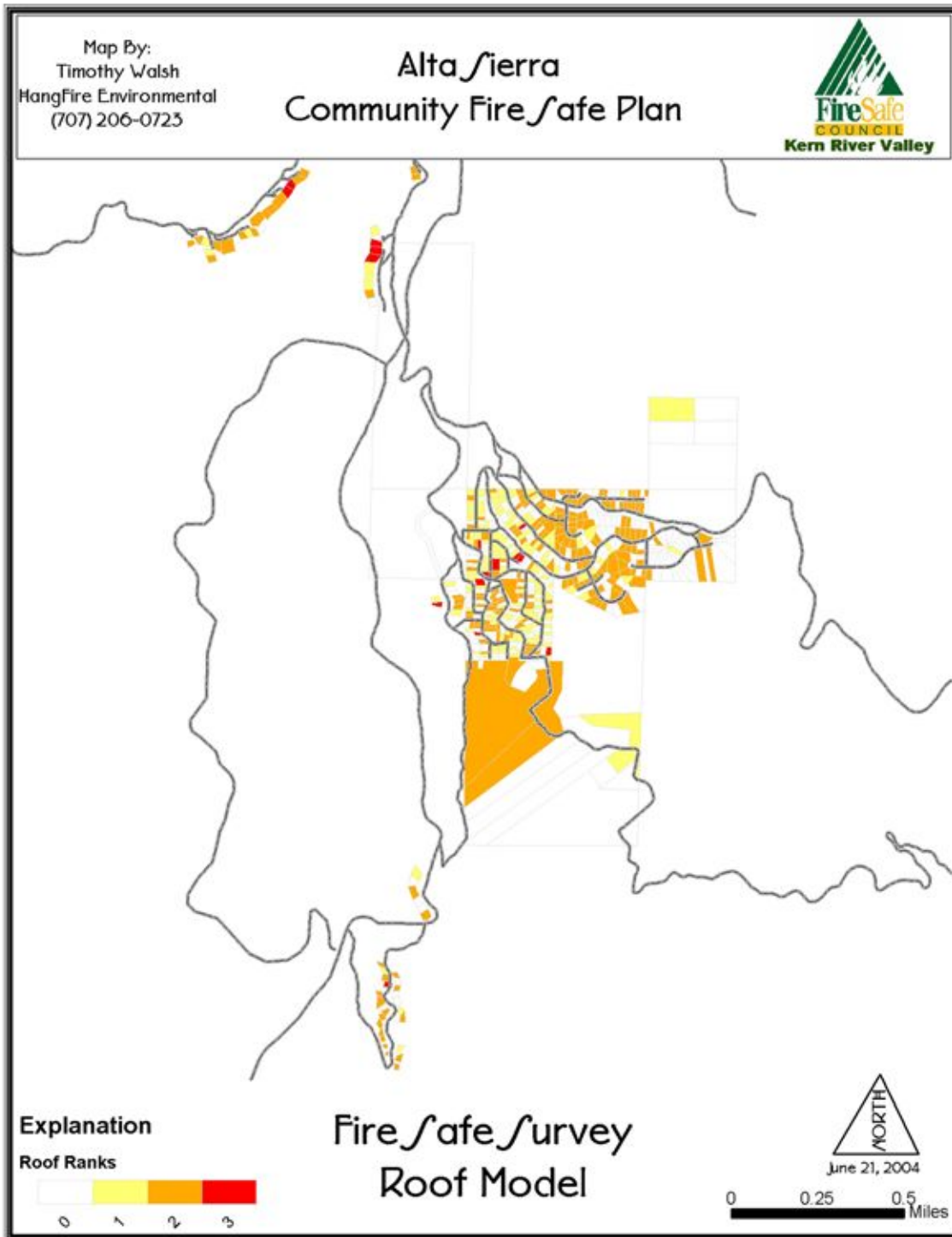
The house surveys were performed by quickly observing the homes from their front yards or sometimes the backyards. Often, specific building material could not be determined due to access issues or respecting the privacy of homeowners. Often addresses were only found after looking up for a sign posted in a tree or looking behind vegetation.

Roof Types

The roof types were ranked based on the ability to resist ignition. It is surprising, based on the age of the community, the lack of wood roofs. This is a very positive factor concerning survivability. Although very few exist, tile or slate roofs received the highest rank. Metal roofs shed pine needles better than composite roofs. They would also resist burning longer if a pile of pine needles residing on a roof were to ignite. Composite roofs, the most prevalent, will generally resist ignition if they are not weathered too badly. Wood roofs have the highest probability of ignition. They also pose a serious risk to surrounding homes. Burning wood shingles can travel great distances within a smoke column of an actively burning wildfire. Please see Map 8-Roof Rank Model.

Table 25: Roof Ranking Methodology

Roof Type	Ranking	Risk Label	Number of Homes
Tile/Slate/Metal	1 Low	High	152
Composite	2 Moderate		216
Wood	3		16



Map 8: Roof Rank Map-Ranks are based on the methodology found in Table 25.

Siding

The best siding material from a fire perspective is one that will not burn. This can be stucco, cement, or stone. Unfortunately, this is very unpopular among the homeowners of Alta Sierra. The next best siding would be homes built of logs. Even though logs are combustible, the low surface to volume ratio causes it to burn very slowly, which makes it very appropriate for medium and high fire risk situations. The most common siding throughout the community is wood panels such as T1-11 plywood. Wood panels and boards are the most common and economical forms of siding, but they are readily combustible. This siding is usually not very thick, 1/2 inch to 3/4 inch, and will burn through to the structure behind it in less than 10 minutes.

A few homes in Alta Sierra have been resided with vinyl siding. The Vinyl Siding Institute website¹⁰ states, "Rigid vinyl siding is made from organic materials and will melt or burn when exposed to a significant source of flame or heat. Building owners, occupants, and outside maintenance personnel should always take normal precautions to keep sources of fire, such as grills, and combustible materials, such as dry leaves, mulch, and trash, away from vinyl siding."

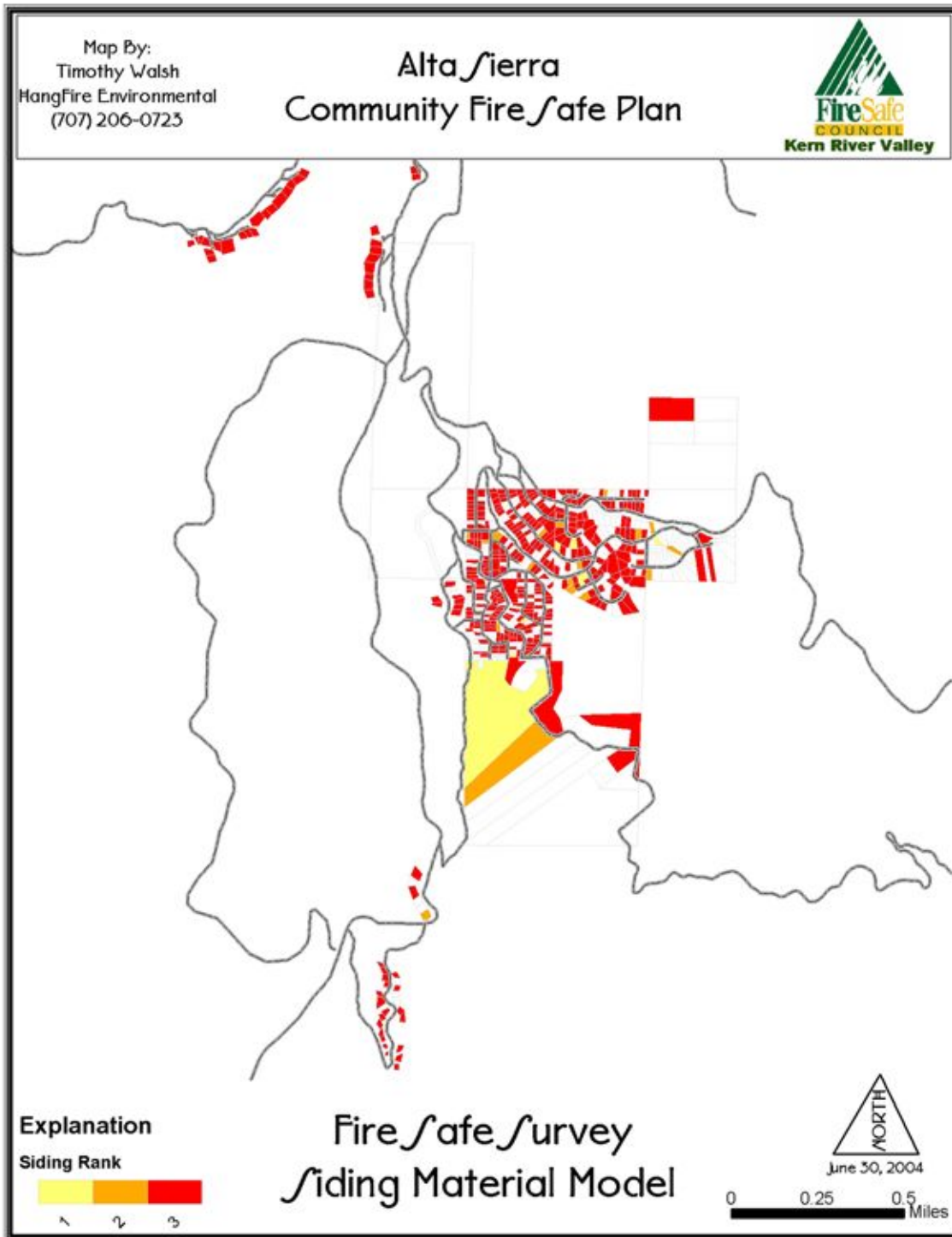
"When rigid vinyl siding is exposed to significant heat or flame, the vinyl will soften, sag, melt, or burn, and may thereby expose material underneath. Care must be exercised when selecting underlayment materials because they are made from organic materials that are combustible." With this information, vinyl siding has been given the same "High" rank as wood. Please see Map 9-Siding Material Model.

Another siding material conflict is when multiple material types are used to build homes. For example, one home used stucco for a major portion of the residence. Unfortunately, the home is wrapped with a wood lattice-covered deck and has wood siding for the upper story and gables. Hence, the home was giving a High rank due to the wood material that would most likely ignite and compromise the home. Other homes are built of logs or enclosed with asphalt siding only to have the a portion of the home covered in wood siding. These properties were also given a "High" rank.

Table 26: House Siding Ranking Methodology

Siding Type	Ranking	Risk Label	Number of Homes
Stucco/Block/Fiberboard	1	Low	8
Log	2	Moderate	18
Wood/Vinyl	3	High	358

¹⁰ <http://www.vinylsiding.org/install/notes.htm#fire>



Map 9: Siding Material Model Map ranks are based on the methodology found in Table 26.

Decks

Decks are very popular within Alta Sierra. Decks are highly combustible structures and are built perfectly to burn. All the components of a deck; joists, decking and railings, are made of only 2 inch thick (on average) wood with a high surface-to-volume ratio. When fire approaches, the wood quickly dries out and heats up. Ignition can occur very easily from either radiant energy from the fire or burning embers.

Decks pose a hazard from both above and below the horizontal structural plane. If a burning ember lands on the top of a deck, which is the largest horizontal surface on a structure (outside of a flat roof), there is a good chance it will find a receptive fuel to ignite and burn. The receptive fuel could be a pile of pine needles, a stack of firewood, or plastic lawn furniture. They are the ultimate heat traps due to their shape that traps hot gasses from an approaching fire from below. Decks often face downhill towards a fire's most likely approach. The safest deck is one that is fully enclosed. Unfortunately, very few exist within the community.

Any opening under a house or porch will allow burning debris a point of entry under the structure. Openings under stairs, decks, and porches usually allow organic material such as pine needles, leaves, and small limbs to collect under the home. Once burning debris blows under the house or porch, it is likely the home will burn down. Several homes have lattice covering the lower portion of



the house or deck. This will not stop firebrands from blowing through the holes in the material. To compound the problem, lattice is usually made of 1/4-1/2 inch wood that readily ignites. Please see Map 10 - Decks or Opening Under House Model.

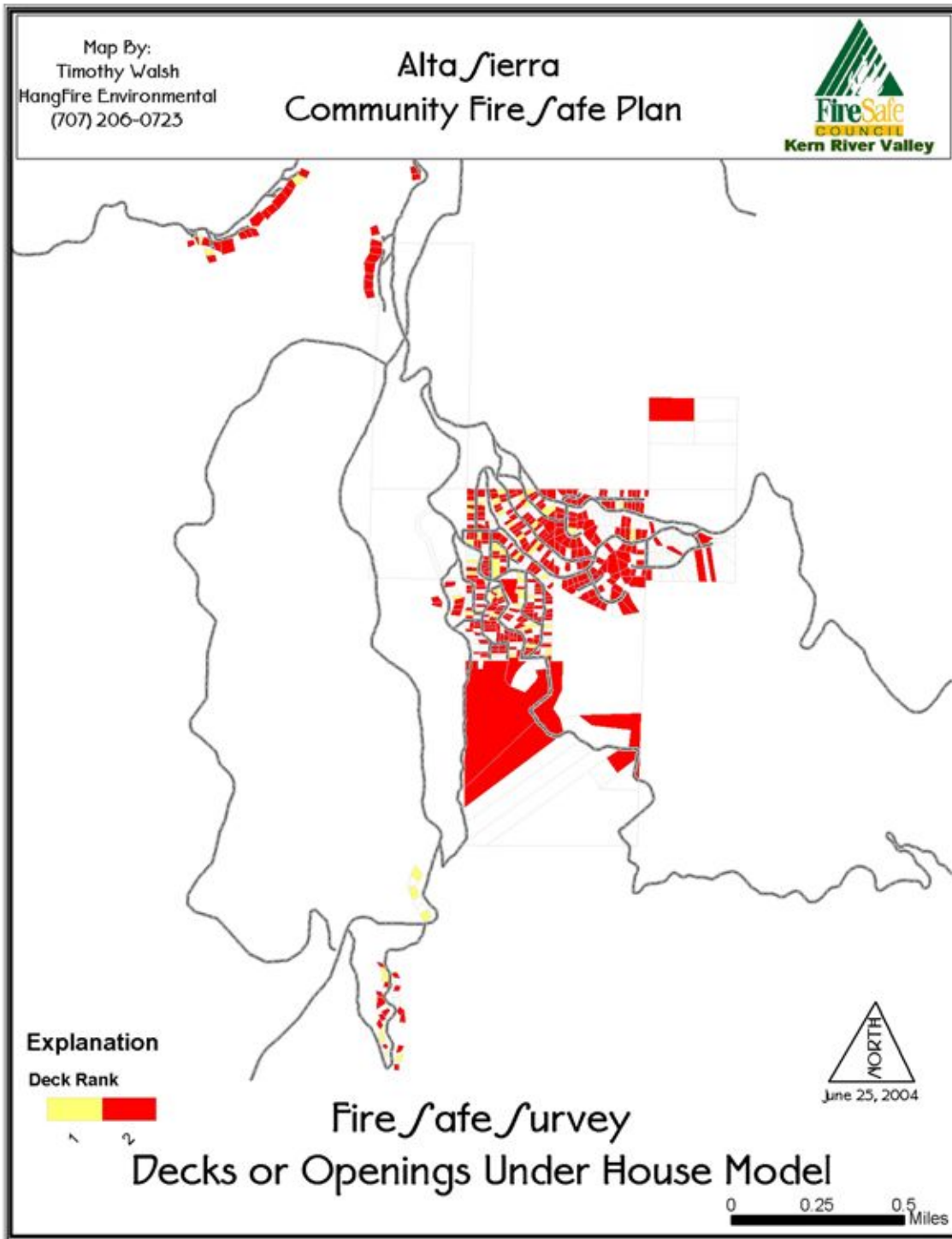
Figure 19: The entire home is built above the surface of the ground. Blowing embers will land under the house traveling through the lattice and openings seen under and to the left of the window. Photograph by Timothy Walsh

Table 27: Deck or Opening under House Ranking Methodology

Deck or Opening under House	Ranking	Risk Label	Number of Homes
Not Present or Enclosed	1 Low		57
Present 2 High			327



Figure 20: This home on Alta Sierra Road has a very hazardous deck with highly combustibile Manzanita in close proximity. A wildfire would cause burning material to either land on the deck or ignite it from below. Once the deck is aflame, the home will be jeopardized. Photograph by Timothy Walsh



Map 10: Decks or Openings Under House Model Map ranks are based on the methodology found in Table 27.

Address Posting

The posting of addresses needs to be codified and adopted. Several homes did not have an address posted. Other homes use the three digit “old” numbering system while others used the newer four or five digit numbers. Finding the specific homes based on addresses was the most difficult part of the survey process. Even using a computer, the Property Owner Association’s Directory, and several Assessors’ maps, finding a particular address sometimes took 5-10 minutes.

Some homes had their addresses posted on the rear of the house because that is where the owners make access. Other homes painted the address numbers the same color as the wall it was placed on.

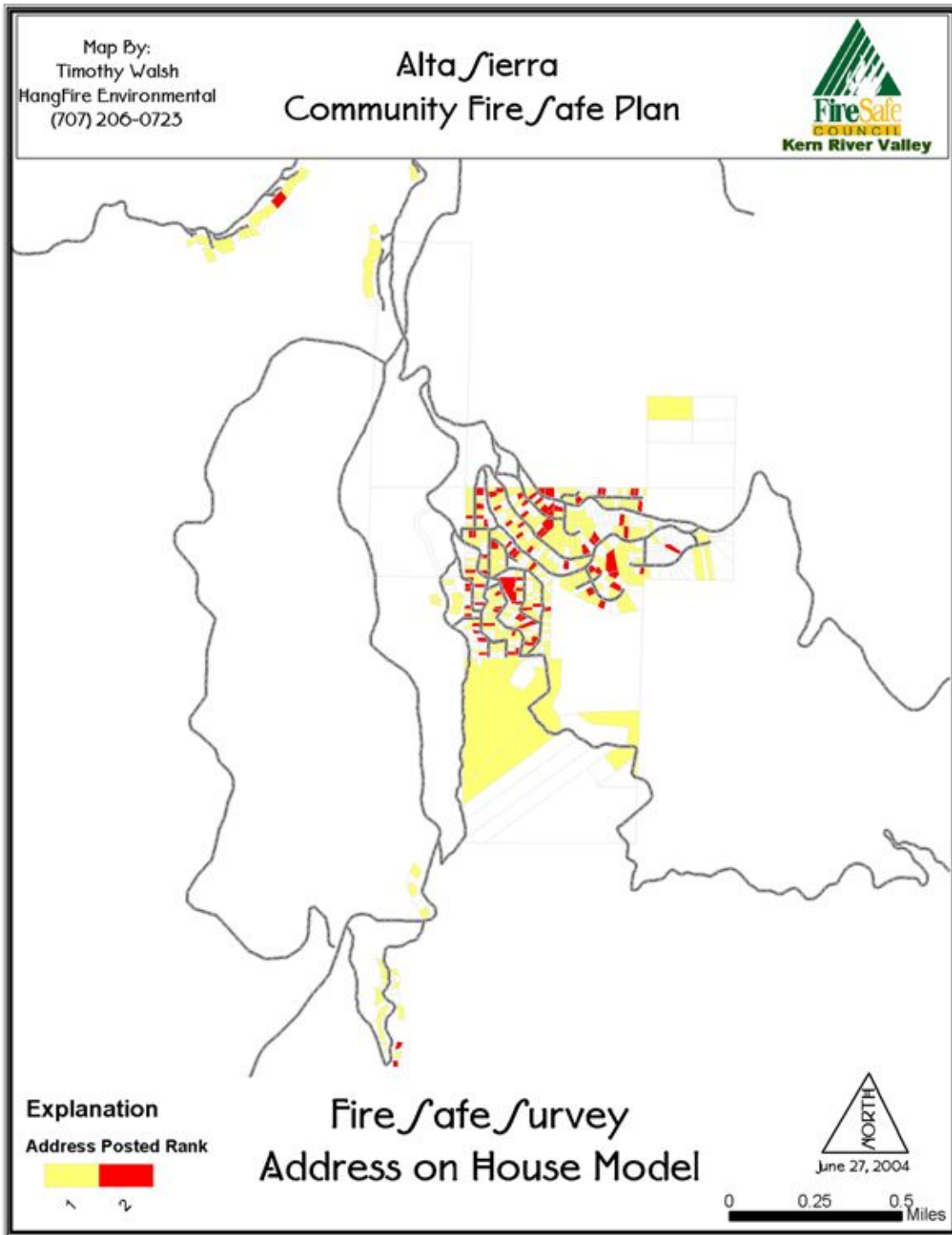
The most popular method was to place a sign on a tree that will surely ignite and burn during a fire. Finding an address during a wildland urban interface fire in a timely manner can make the drastic difference between structure protection or structure loss. A successful initial attack of a structure fire can only be performed if the house can be found quickly. This is very difficult within Alta Sierra during great weather conditions but will nearly be impossible when visibility is clouded by smoke. To emphasize this point, Figure 21 was photographed during a cloudy day in Alta Sierra. Please see Map 11- Address on House Model.



Figure 21: This structure located in the El Monte Tract is difficult to see due to the foggy conditions. This will be similar to smoky conditions faced by firefighters trying to locate an address during a fire. Photograph by Timothy Walsh

Table 28: Address Posting Ranking Methodology

Address Posted	Ranking	Risk Label	Number of Homes
Present	1	Low	295
Not Present	2	High	89



Map 11: Address on House Model Map ranks are based on the methodology found in Table 28.

Firefighter Access

Firefighter access is based on how easy it would be to find and back a fire engine into a driveway. When fire engines perform structure protection, they back into a driveway so if fire conditions worsen, they can quickly escape. The driveway lengths were paced by walking and the accuracy is somewhat subjective. Other areas were ranked with a “High” risk due to the distance of the access road. For example, the access into the Shirley Meadows Special Use Permit Cabins is very narrow and isolated from the rest of the community.

Access in general is very poor due to the extremely narrow roads. With the exception of the newer section of the community, defined as east of Ponderosa Drive, the roads are too narrow for a Type 1 or municipal fire engine. During a serious wildland fire, it is probable that road congestion will occur, especially on a weekend when visitation is high. This very dangerous condition can lead to injury and/or death.

Table 29: Firefighter Access Rankings

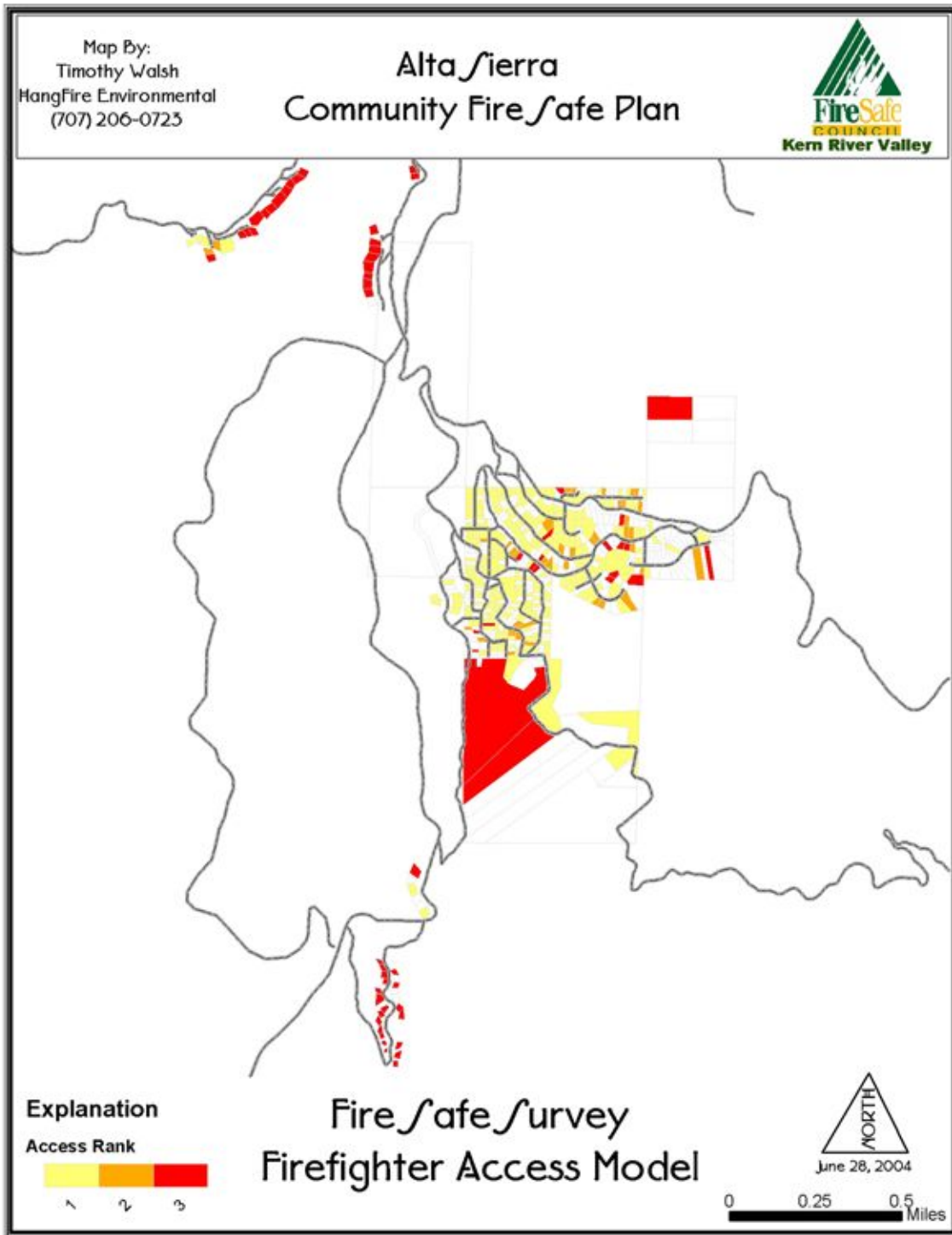
Access Distance	Ranking	Risk Label	Number of Homes
Driveway on the street	1	Low	281
Driveway up to 80 feet from street or steep driveway	2	Moderate	40
Driveway over 80 feet from street or steep driveway	3	High	63



Figure 22: Many roads throughout Alta Sierra will only support a single vehicle as seen in the photograph of Ice House Road. Road congestion will occur with larger fire apparatus. Photograph by Timothy Walsh

Other access issues are homes that are invisible from the street. If there are no addresses posted or mailboxes, firefighters from out of the area will not even know a home exists. A few homes meet this criterion. To emphasize this point, the local fire engine didn't know how to access a home on Sequoia Road.

Another factor concerning access is bridges. Access to some homes on Alta Sierra Road is only accomplished by crossing a bridge. Most bridges do not have a weight limit posted and those that do, will not support the weight of a fire engine carrying 500 gallons of water. Fire engines will need to park in the street to perform structure protection. While this may be possible by adding additional hose, the narrow streets will most likely become blocked by fire apparatus. Please see Map 12- Firefighter Access Model.



Map 12: Firefighter Access Model Map ranks are based on the methodology found in Table 29.

Slope

The hazard with slope and its affect on fire behavior has already been captured within this plan. Using very sophisticated software, the mean slope of each parcel was calculated. This assessment will not only show parcels with developed homes but will also assess vacant parcels as well. This assessment will also be used for the vacant parcel assessment that will indicate the parcels with the biggest fire threats. Only Non-Federally¹¹ owned parcels are used in this assessment. Please see Map 13 Mean Slope of Parcel Model.

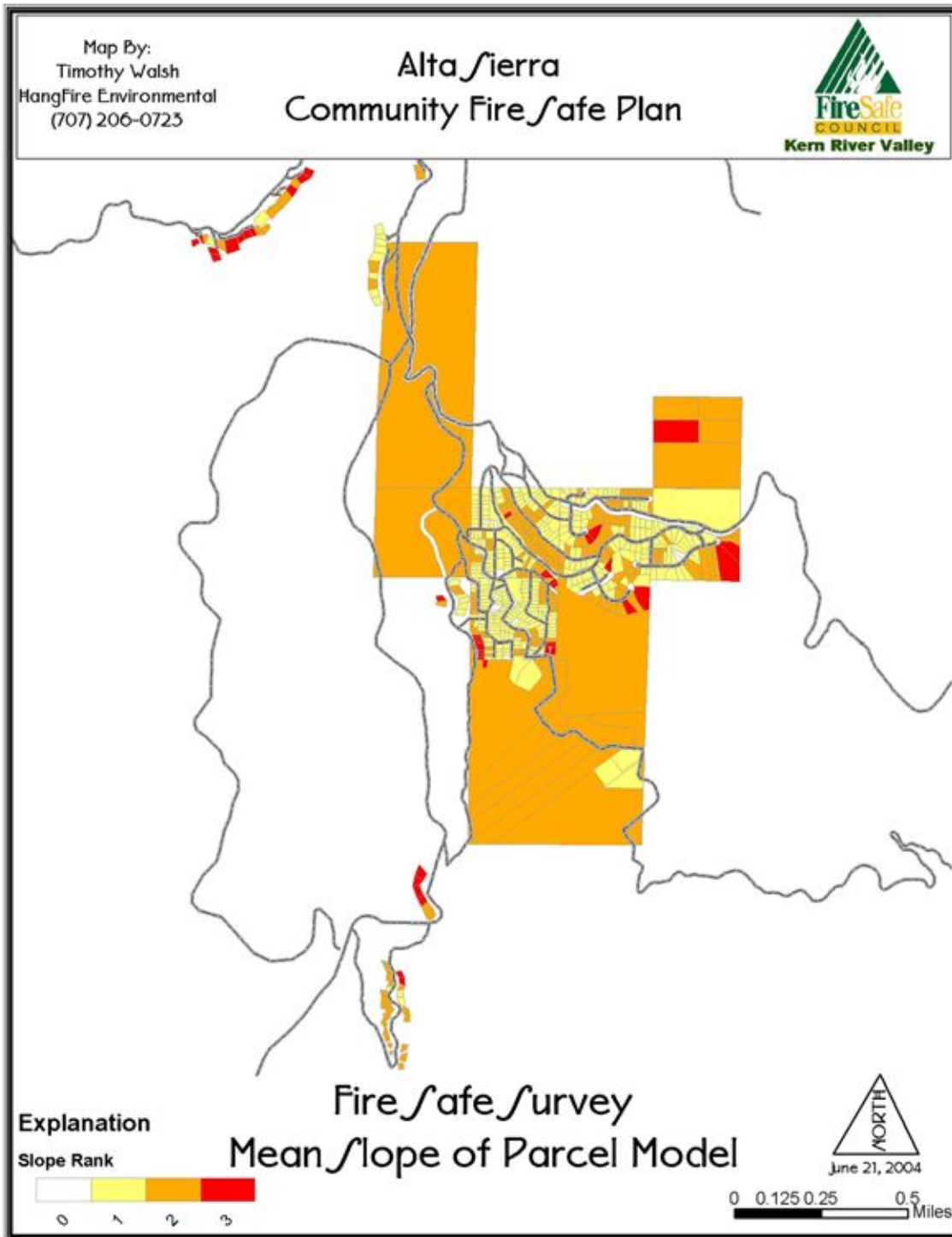


Figure 23: The stairway running downslope displays the steepness of the parcel. This home is located on Pinecone Way. Photograph by Timothy Walsh

Table 30: Mean Slope of Each Developed Parcel Ranking Methodology

Mean Percent Slope	Rank	Risk Label	Number of Homes
0-10 Percent	0	Low	3
11-25 Percent	1	Moderate	222
25-40 Percent	2	High	136
Over 40 Percent	3	Very High	22

¹¹ The Federally owned parcels are large and the slopes are captured in Map 3 .



Map 13: The Mean Slope of each Parcel Model Map ranks are based on the methodology found in Table 30.

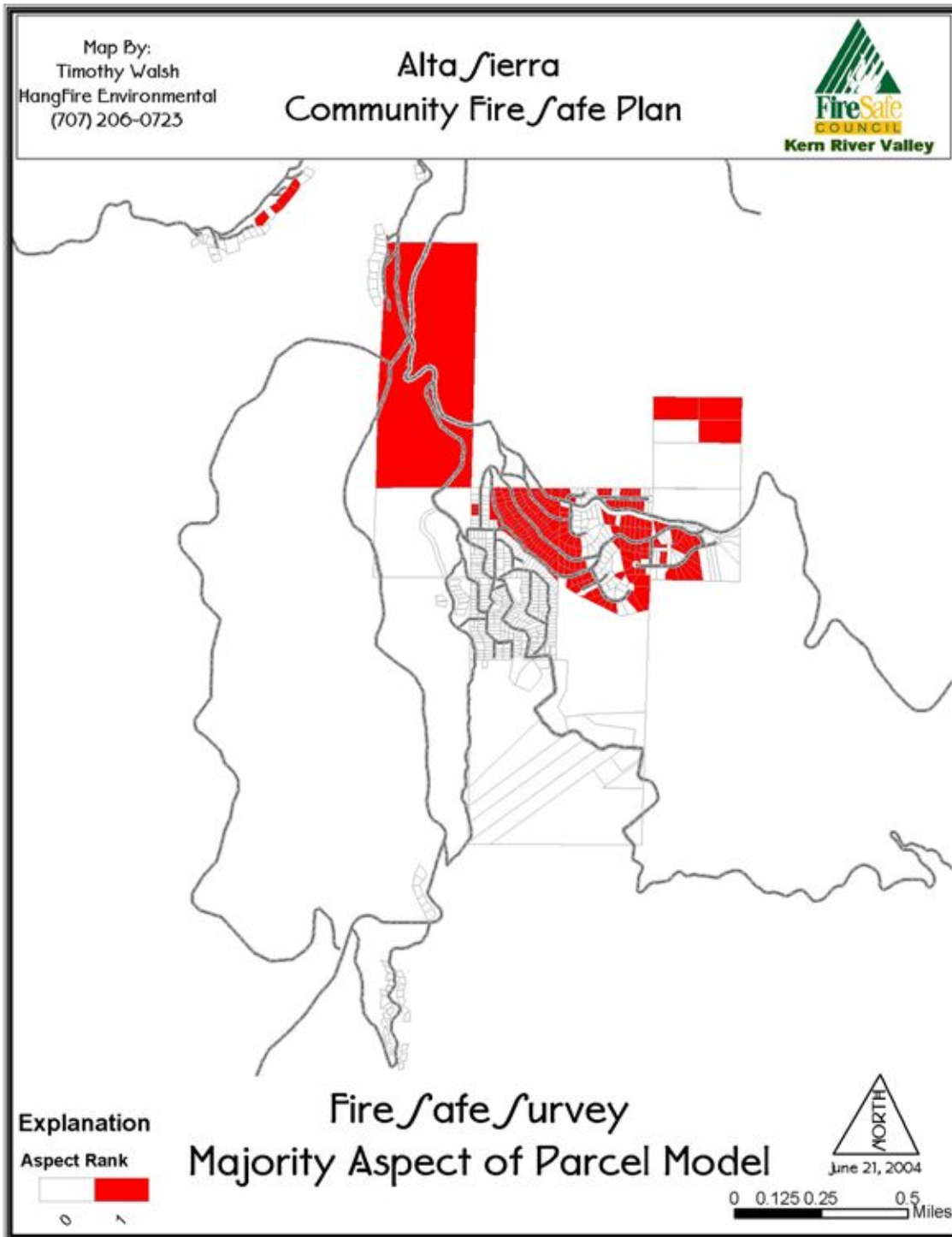
Aspect

Aspect, like slope was also discussed earlier in this plan but now it will be assessed at the parcel level. The greatest effect aspect has on a parcel is the amount of sun it receives. All vegetation found on the south, southwest, and west facing slopes will have lower fuel moistures for both live and dead fuels. Rates of fire spread and fire intensity will increase with a drop in fuel moisture and ignition becomes easier in the fine fuels such as grass.

The direction each slope faces within each parcel was calculated. Each parcel was given a “High” rank if the majority of the parcel faces south, southwest, or west. Please see Map 14- Majority Aspect of Parcel Model.

Table 31: Majority Aspect within Each Parcel Ranking Methodology

Aspect	Rank	Risk Label	Number of Homes
All Other Aspects	0	Low	254
South, Southwest, West	1 High		129



Map 14: The Majority Aspect of each Parcel Model Map ranks are based on the methodology found in Table 31.

Other Hazards

A number of parcels had other hazards present that could affect the likelihood of wildfire survivability. Five categories of hazard were captured within this assessment and cataloged from either the house-by-house survey or viewing the photographs of each home. Please see Map 15. The ranks of each parcel were increased by one if they exhibited any of the following hazards:

Parcels with Manzanita, a species of brush, which either was found in high concentrations or in close proximity to the house. Manzanita burns readily because of the waxes and resins it produces to conserve water during the dry summer months. Manzanita also provides a ladder for flames to climb into the canopy of oaks, pine, or cedar trees.



Figure 24: Manzanita in the front yard of this house could burn with enough intensity to ignite the lower tree branches. If the branches ignite, there is an opportunity for the entire tree to torch, which would loft embers in the direction of the prevailing wind. Photograph by Timothy Walsh.

Homes with firewood stored next the house or in high

concentrations: Several homes have firewood stacked next to, under, or in close proximity to wood siding or decking material. Several dwellings have kindling stacked in a similar fashion. In the event of a fire, firewood will ignite and most likely jeopardize the home.



Figure 25: This house has firewood stacked in several places. The small diameter of the wood will readily ignite and the heat output could exceed the protection offered by the metal siding. Photograph by Timothy Walsh.

Homes with plastic tarps next to the home or under a deck: Tarps are used to cover firewood or vehicles such as snowmobiles. Tarps are made of plastic, a material high in very flammable hydrocarbons. Once ignited, they burn similar to another hydrocarbon known as gasoline.



Figure 26: This house has a tarp covering firewood next to 1/2 or 5/8 inch plywood found under the deck. This tarp would ignite easily and burn with high enough intensity to ignite the plywood. Photograph by Timothy Walsh.

Parcels with building materials stored on the parcel: If the materials appeared to be temporary, then the rank was not increased. But if the material showed signs that it had been in place for some time, then the rank was increased. Untreated wood begins to discolor and gray if it has been in the weather for some time.

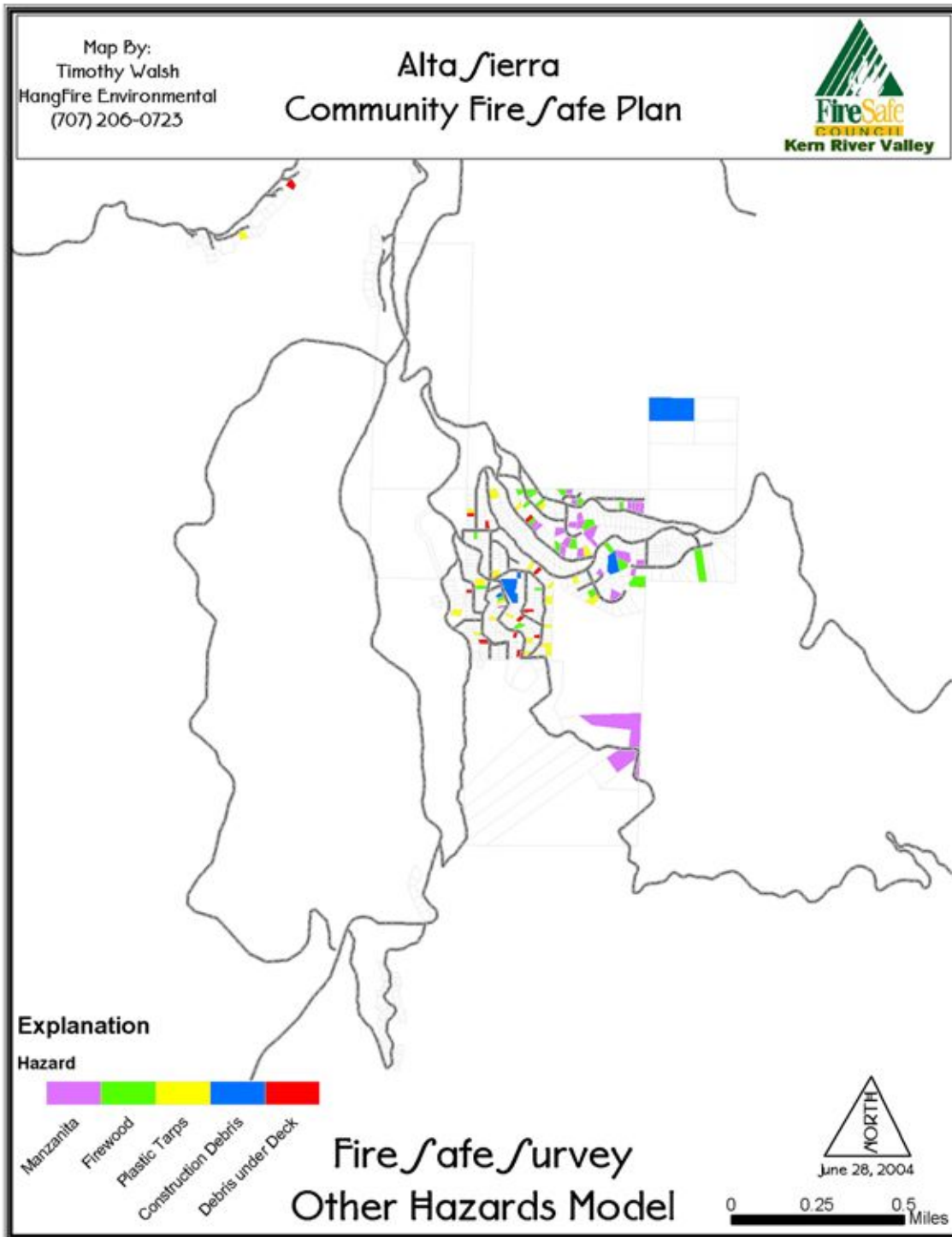


Figure 27: This home is being remodeled and has piles of construction debris covering the parcel. Residents stated that this parcel has been in this condition for some time. Photograph by Timothy Walsh.

Combustibles stored under the deck: Several homes stored or stacked plywood or construction materials under their decks. During a fire, this material could ignite and compromise the home.



Figure 28: Boards stored under the deck could easily ignite during a wildland fire. Photograph by Timothy Walsh.



Map 15: Other Hazards Model Map-Each parcel with a hazard was given an additional point towards the Total Wildland Fire Hazard Rank.

Other Significant Conditions

The final ranks for parcels were adjusted based on factors of survivability or significant risk. For example, if a homeowner provided a large area of defensible space, then the Total Wildfire Rank was lowered. On the other hand, if the home has been condemned or should be, then the Total Wildfire Rank was increased.

Defensible space is an area that will help protect a home and provide a safety zone for firefighters who are protecting it. Clearing all flammable vegetation a minimum of 30 feet around a home and other structures will not only provide a home with the greatest chance for survival, it is also required by California law¹².

One example of adequate defensible space based on fuel type, slope, and aspect is found at 8301 Old State Road. The owner has provided enough clearance of vegetation that firefighters could protect the structure without jeopardizing themselves or equipment.



Figure 29: The defensible space in this photo is located behind 8301 Old State Road. The photograph is a mosaic of photos taken from the deck. The large area where the fuel has been modified creates a safer home that may survive even without fire protection. Photograph by Timothy Walsh.

Some homes have become so dilapidated that they threaten many homes around them in the event of a fire. These houses are falling apart and have several areas that are open allowing embers an easy point for ignition.



Figure 30: The County has condemned this house as seen by the orange notice posted on the siding. Half of the porch has collapsed leaving a pile of wood susceptible to ignition. Photograph by Timothy Walsh.

¹² Public Resource Code 4291

Total Wildfire Hazard

A Total Wildfire Hazard Rank was assigned to each parcel and is a sum of all the ranks discussed previously. They include:

- Roof Rank
- Siding Rank
- Deck or Openings under House Rank
- Address Posted Rank
- Access Rank
- Slope Rank
- Aspect Rank
- Other Hazard Rank
- Special Hazard Rank

Table 32: Total Wildfire Hazard Ranking Methodology

Summed Rank Value	Rank Number	of Homes	Percent of Parcels
8 - 10	Moderate	147	38 Percent
11 - 12	High	158	41 Percent
13 - 16	Very High	79	21 Percent

Please see Map 16-Total Wildfire Hazard Rank.

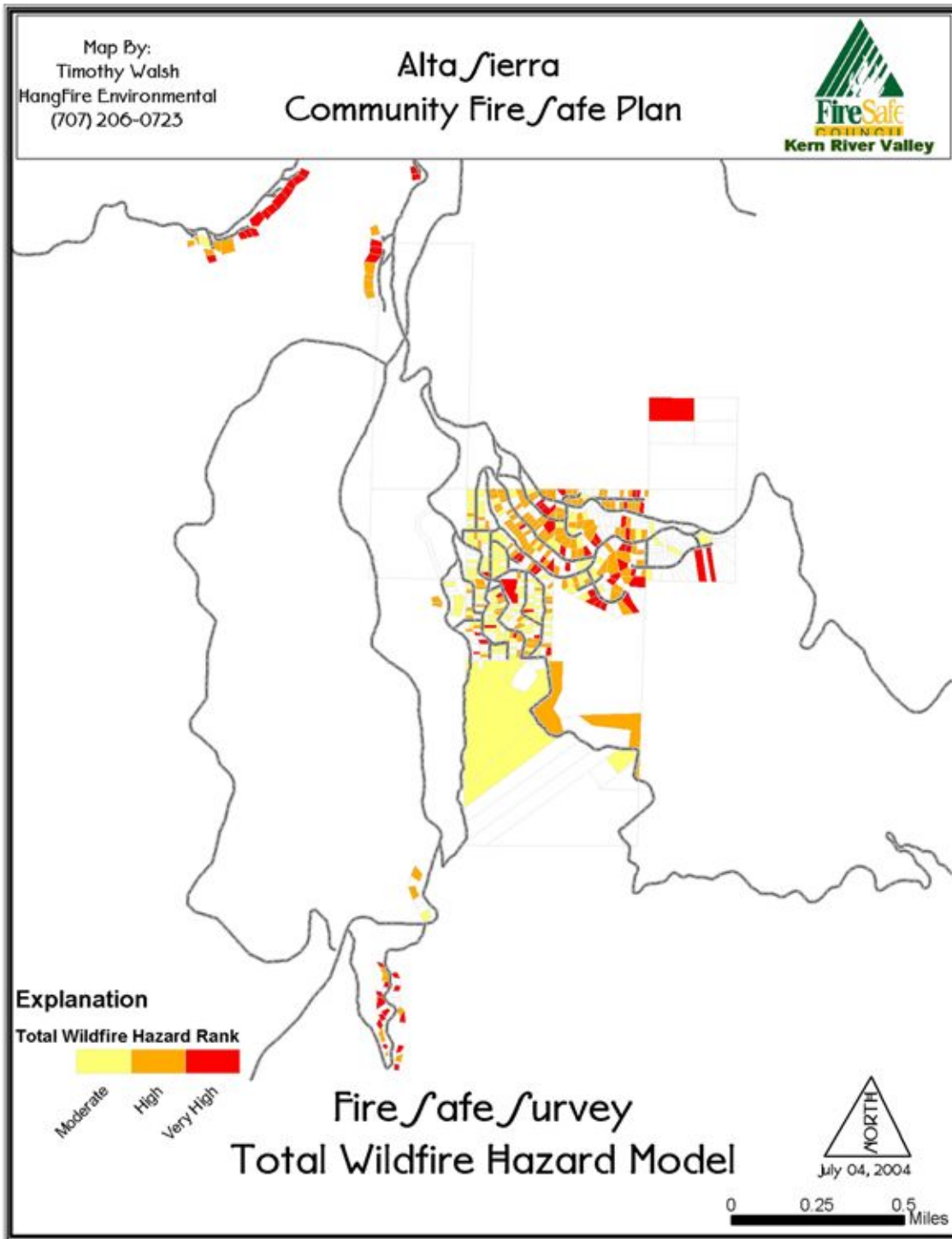
Vacant Parcels

Vacant parcels throughout the community pose a fire risk to developed parcels in close proximity. To determine the risk posed by each vacant parcel, an assessment was performed. The components of this analysis include:

- The number of developed parcels each vacant parcel threatens.
- Fuel loading data from the Fuel Management Plan.¹³
- Mean Slope calculated for each vacant parcel.
- Majority Aspect calculated for each vacant parcel.

The higher number of developed parcels that share a property line to a vacant parcel, the greater risk it poses. The vacant parcels that threaten the highest number of developed parcels are owned by either the Federal or County government. Unfortunately, tree density and size data were only provided for Alta Sierra proper in the Fuels Management Plan. Therefore, the assessment will only concentrate in those same areas. Please see Table 33: Number of developed parcels each vacant parcel threatens methodology and Map 17.

¹³ The Fuel Management Plan was developed as a separate document as part of the Alta Sierra Fire Safe Grant.



Map 16: Total Wildfire Hazard Rank Map is a summation of all hazard ranks previously discussed. The ranks are based on the methodology found in Table 32.

Table 33: Number of Develop Parcels Threatened by Vacant Parcel Methodology

Number of Developed Parcels Threatened by a Vacant Parcel	Rank	Rank Label	Number of Vacant Parcels
0 0		No Rank	49
1 1		Moderate	66
2 2		High	73
3 or More	3	Very High	70

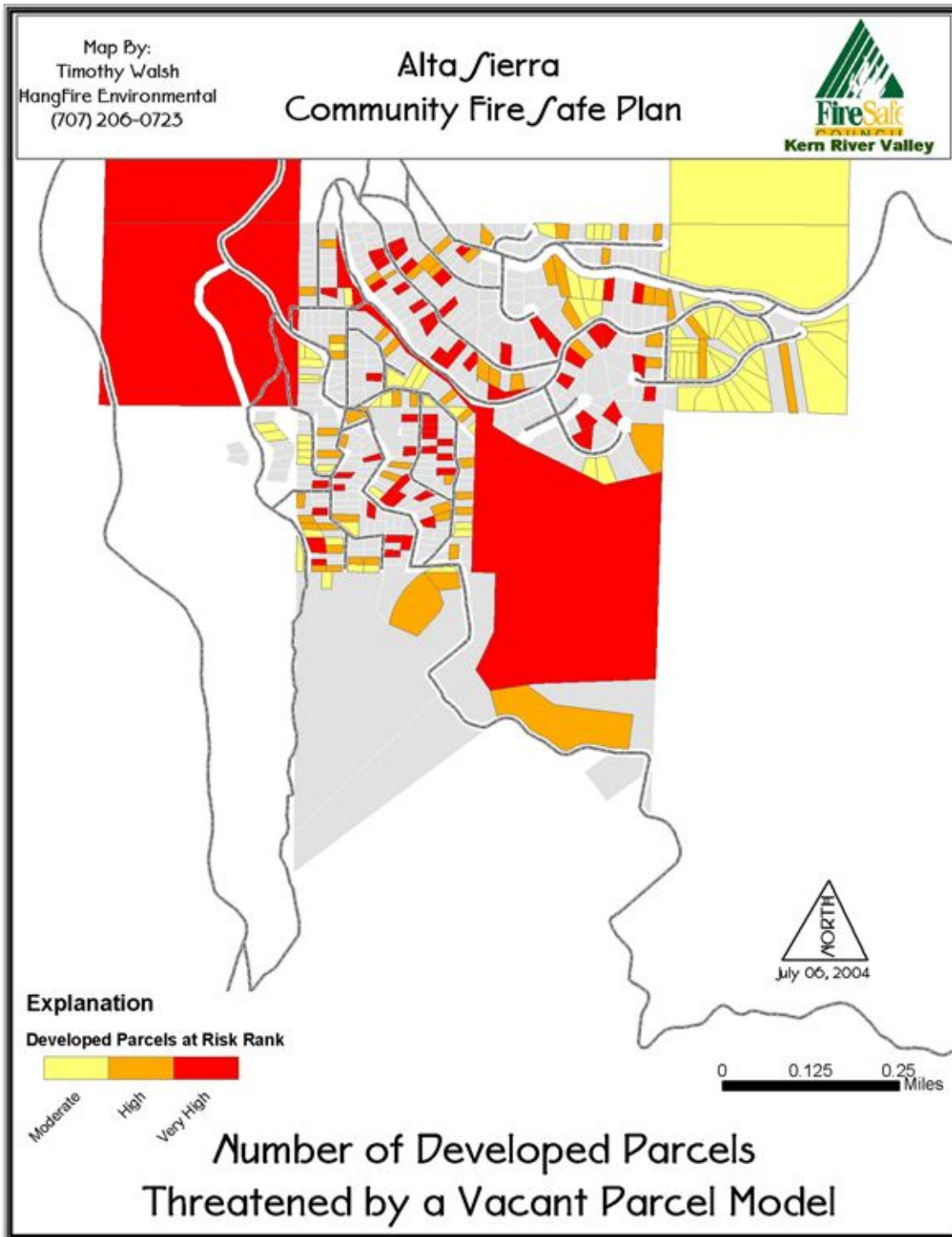
The next step of the vacant lot assessment was to add the ranks from the Forest Management Plan’s Forest Risk Assessment. Each vacant parcel was analyzed to compute the majority forest risk designation with ranks assigned. Please see Table 34 for rank methodology.

Table 34: Majority Forest Risk Ranking Methodology

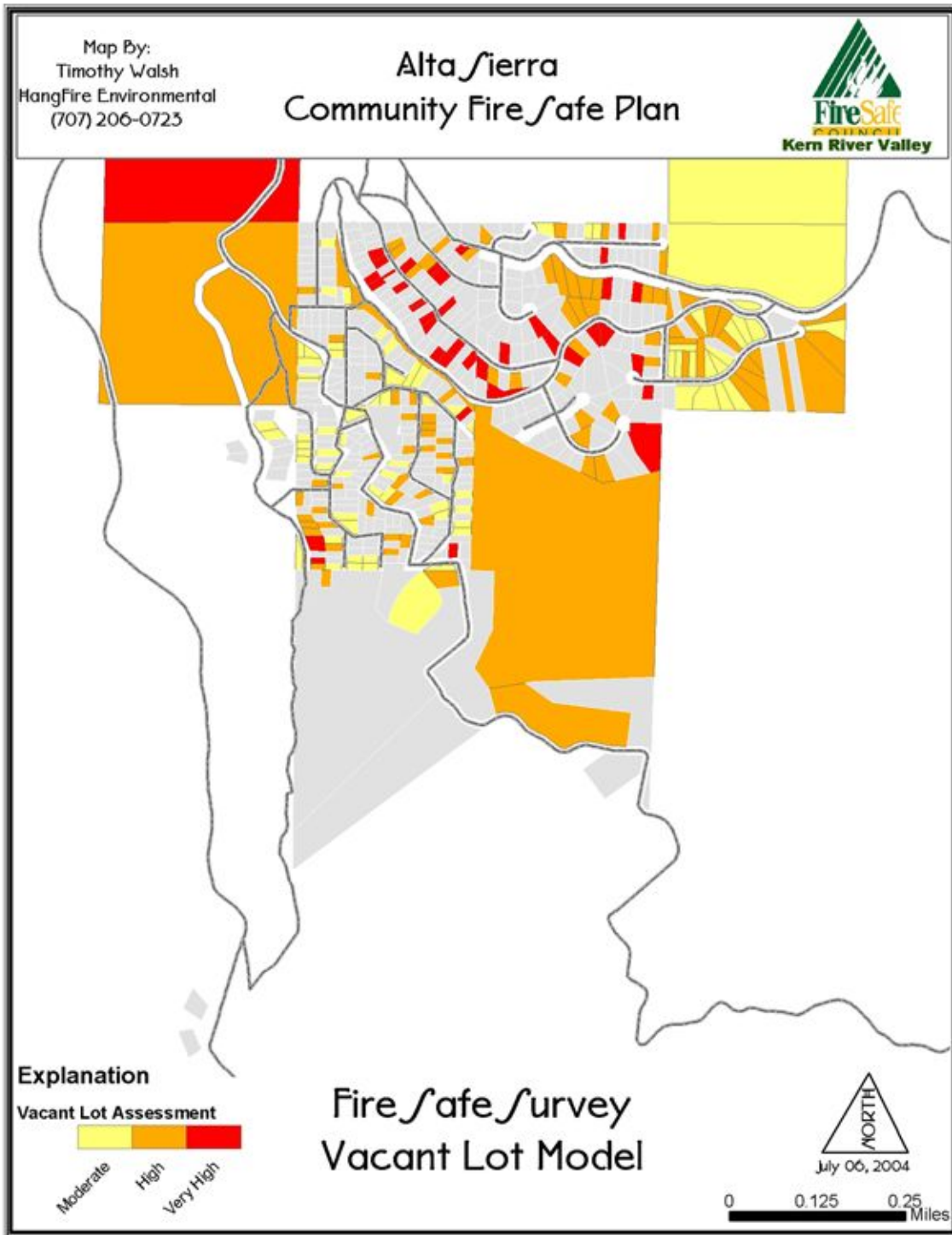
Forest Risk Assessment	Rank
Medium 1	
High 2	

The last two components to the vacant lot assessment were to assign the slope and aspect rank¹⁴ to each vacant parcel. All of the aforementioned ranks were summed to complete the vacant lot hazard assessment. The end result is an assessment that indicates which vacant parcel pose the greatest threat to developed parcels. It combines how steep of slope the parcel is situated on, whether they are located on a hot southern through southwestern facing slope, combined with the hazards posed by the density and size of the trees. Please see Map 18-Vacant Lot Model.

¹⁴ Please see Maps 13 and 14 for parcel slope and aspect assignments.



Map 17: Number of Developed parcels Each Vacant Parcel Threatens Model Map. The ranks are based on the methodology found in Table 33.

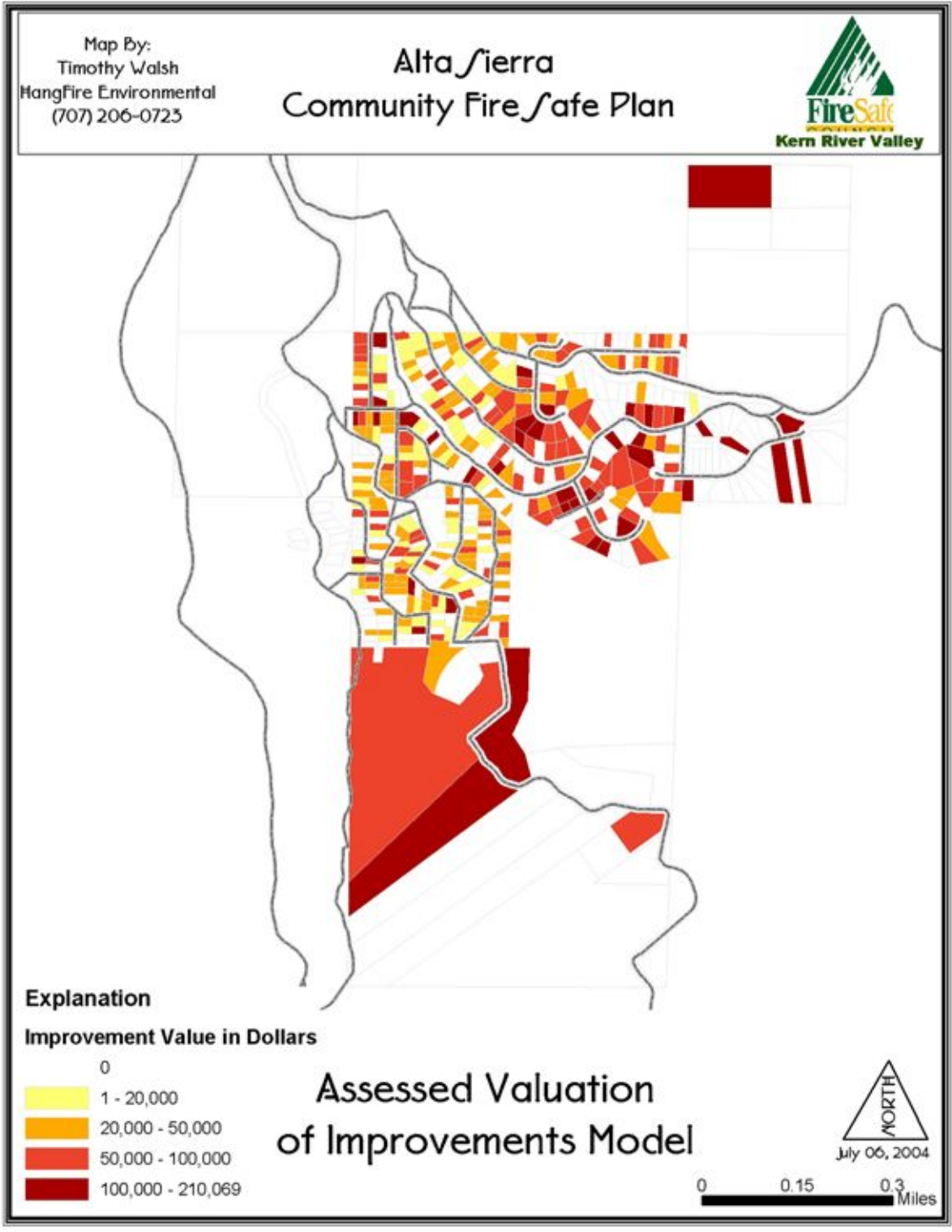


Map 18: Vacant Lot Model Map is a sum of the Developed Parcel Rank, Forest Rank, Slope Rank, and Aspect Rank.

Total Assessed Valuation

The last assessment in the assets at risk section will be the assessed valuation. Assessed valuation is the improvement value the tax assessor places on each parcel. For each property, there is an improvement value and land value. Since wildfire will only affect the improved property, land value is ignored for this assessment. Other factors to consider are this data becomes outdated the moment it is published and is not representative of replacement cost due to recent increases in building materials and inflation.

What this information provides is a quick look at the potential damage that could occur during a large damaging wildfire. It should be noted that this assessment does **not** rank structures based on value. Parcels owned by the United States Government do not have improvement values in the database. Therefore, the Special Permit Use Cabins are not shown on the map. Some parcels are shown with zero improvement value in the database even though improvements (dwellings) are in place. The total assessed valuation shown for improvements is \$16,907,555. Please see Map 19-Assessed Valuation Model.



Map 19: Assessed Valuation of Improvement Model Map.

Structure Protection Plan

The structure protection plan will be utilized when a wildland fire is predicted to affect Alta Sierra. It will assist emergency responders to take action in a timely and efficient manner. The United States Forest Service-Greenhorn District of the Sequoia National Forest developed the basic plan. Additional maps, data, and information are included to make a comprehensive plan for decision-making.

Like all data, this information is outdated once it is published. An attempt should be made to confirm phone numbers and address changes annually.



Figure 31: The road map sign located at the intersection of Alta Sierra Road and Jay Way. This location has easy access and will be delineated as a drop point for resources, equipment, and other logistical needs during a wildfire. Photograph by Timothy Walsh.

Alta Sierra/Greenhorn Mountain Structure Protection

Pre-Attack Plan

Incident Command Post Locations

Three Lane

- Where the third lane begins on Highway 155: 3 miles west of Highway 155 turnoff at Wofford Heights.

Highway 155/Alder Creek Road (25S04) Intersection

- 5.1 miles west of Greenhorn Summit, south side of Highway 155.

Staging Area Locations

Fulton Work Center

- 2 miles east of Glennville on Highway 155, south side of the road.

Wofford Heights Park

- Highway 155 to East Evans Road in Wofford Heights.

Glennville Rodeo Grounds

- Glennville Rodeo Ground on Highway 155.

Greenhorn Mountain Park at Highway 155

- Highway 155 and Old State Road-Alta Sierra

Evans Flat Campground

- 8 miles south of Highway 155 on Rancheria Road (25S15), east side of the road.

Safety Zones¹⁵

Shirley Meadow Ski Area

- 3 miles south of Greenhorn Summit on Rancheria Road (25S15).

Cal Trans Building/Summit Fire Station

- Highway 155 at Rancheria (25S15)/Forest Highway 90 (24S15) Intersection.

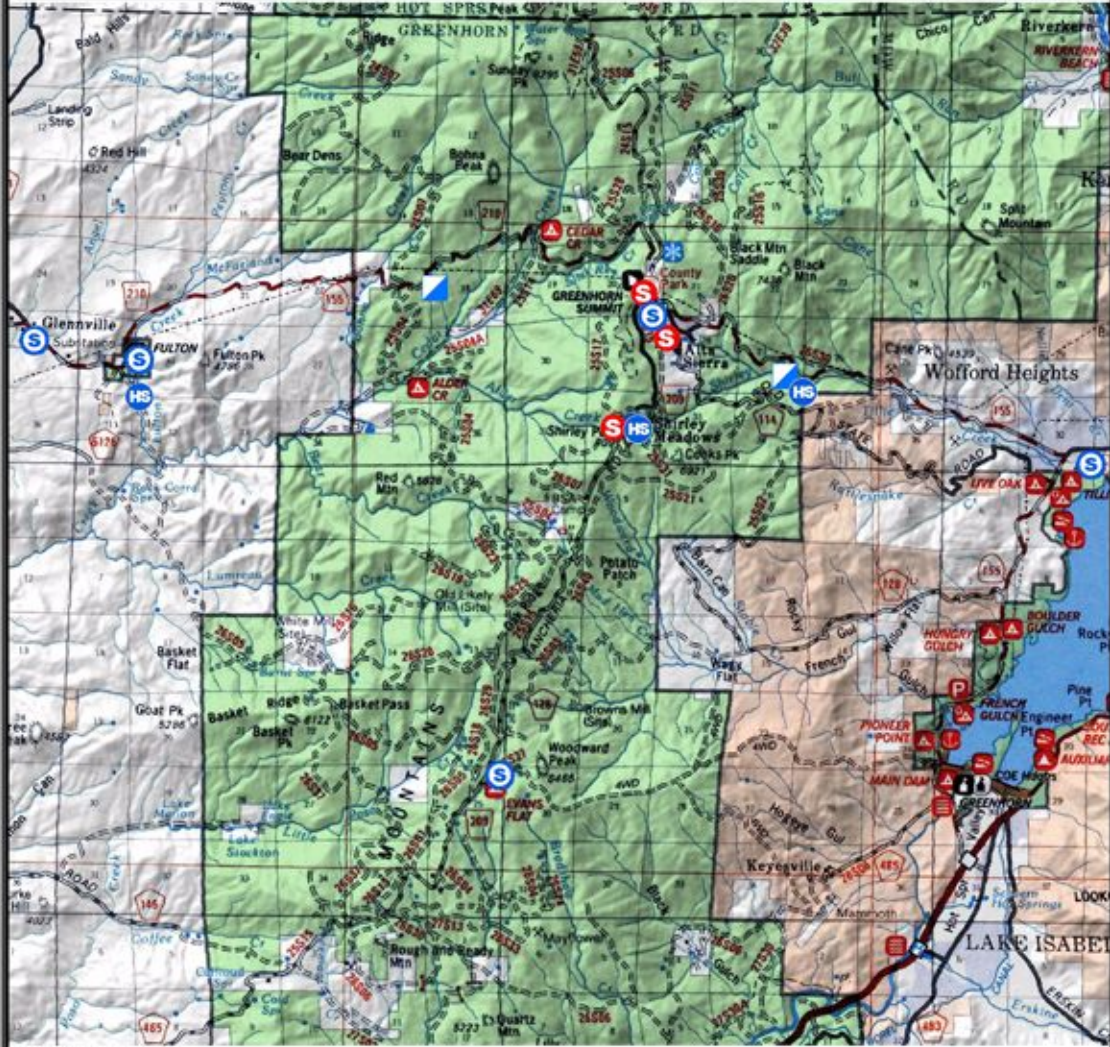
Old Lodge in Alta Sierra

- Intersection of Pine and Old State Road next to abandoned A-Frame.

¹⁵ These safety zones are intended for fire suppression personnel only. These areas may not offer adequate protection for citizens without fire shelters. These zones will not offer adequate protection in the event of a crown fire.

Map By:
 Timothy Walsh
 HangFire Environmental
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Alta Sierra Community Fire Safe Plan

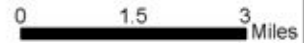


Explanation

Symbol

- Hellspot
- ICP
- Safety Zone
- Staging

Pre-Attack Plan



Map 20: Pre-Attack Plan Map

Helispots

Shirley Meadow Ski Area

- Three miles south of Greenhorn Summit on Rancheria Road (25S15)

Three Lane¹⁶

- Where the third lane begins on Highway 155: 3 miles west of Highway 155 turnoff at Wofford Heights.

Fulton Work Center

- Two miles east of Glennville on Highway 155, south side of the road; first road to the right of office.

Please see Map 20 for all Pre-Attack Plan locations

Water Sources

Water Sources	Storage Tanks	# of Hydrants	Avg. Storage	System Recovery Rate
Alta Sierra Mutual Water Co.	11 14	¹⁷	318,000 gal	30 gpm max
Sierra Bella Mutual Water Co.	7	13	200,000 gal	85 gpm
Summit Station	2	1	10,000 gal	7 gpm
Lens Pond	Water Company access road / Patrols only / Possible dip site 1 Acre pond 10' deep / N35 43.562, W118 32.735			
Cedar Creek	Draft only-unlimited water			

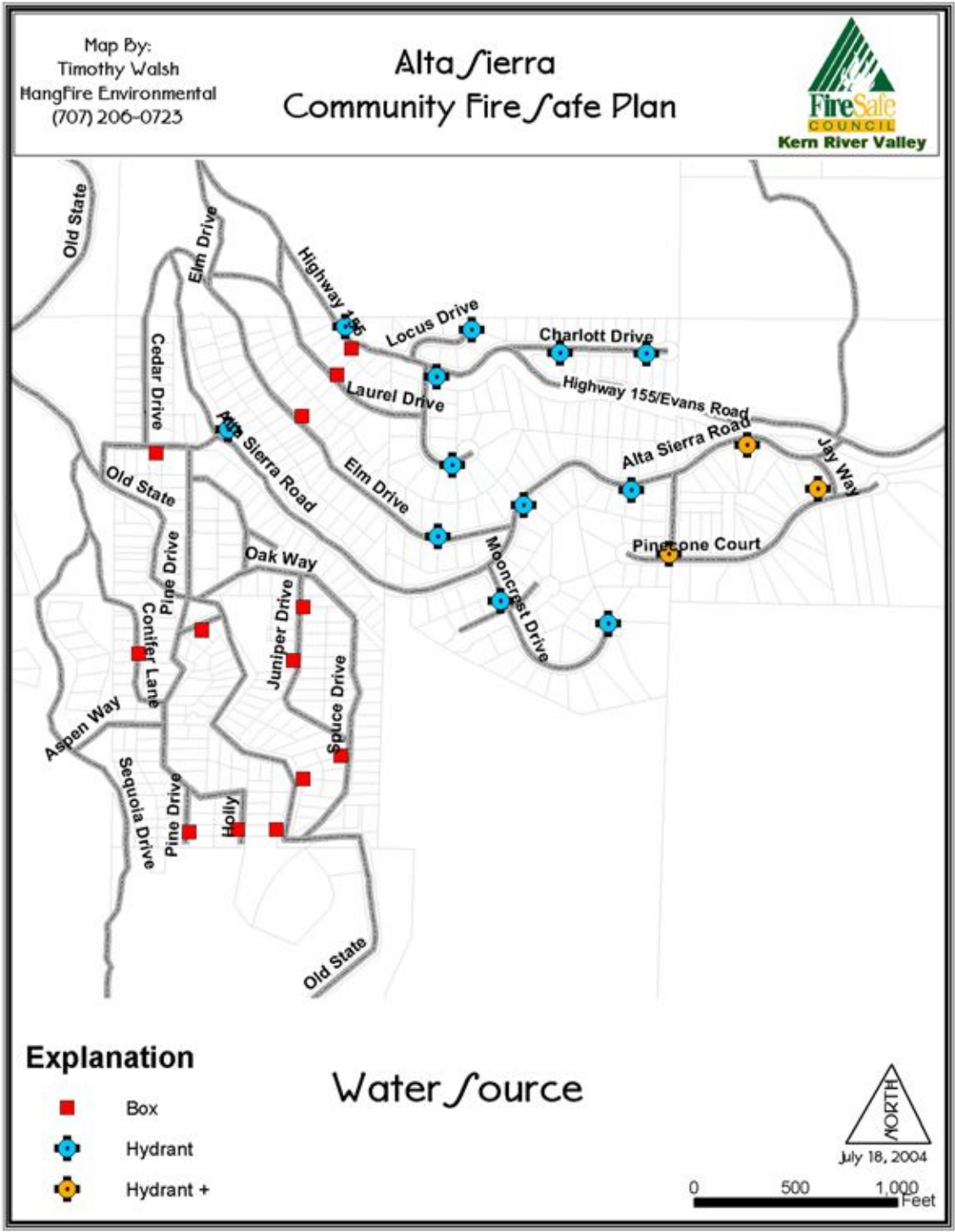


The water supply is very limited when the system recovery rates are considered. There is 374,000 gallons in storage. If 20 fire engines start flowing 500 gallons per minute, there is enough water to remain operational for 37 minutes. Hydrants owned by the Alta Sierra Mutual Water Company operational area are mostly fed by 2½ inch pipe with outlets covered by red wooden boxes. Please see Map 21 for hydrant locations.

Figure 32: This is an example of what may be found under the red boxes. Fittings were not standard. In some cases, hydrants were buried under forest debris.

¹⁶ This should only be considered when no other area is feasible. Once Highway 155 is shut down, evacuation becomes even more difficult.

¹⁷ Red Hydrant Boxes should not be considered as a reliable water source.



Map 21: Water Source Map indicates the approximate locations of the hydrants in Alta Sierra. Hydrant locations were generated from GPS coordinates provided by the USFS and hydrant maps provided by Kern County Fire Department. Hydrants displayed in orange have 4.5 inch outlets.

Communications

Upon activation of this plan, primary incident communications will be coordinated through the Sequoia National Forest. It is imperative that resource ordering is done through a single ordering point. With the large amounts of multi-agency equipment responding to a wildland urban interface incident, unified command will reduce the opportunity for multiple ordering points and duplication of equipment orders.

Phone Numbers¹⁸

Porterville Dispatch: **(599) 782-3120 ext. 701**

Greenhorn Ranger District/Lake Isabella **(760) 379-5646**

Kern County Fire Department Communications **(661)861-2540 (non-emergency)**
(661)324-6551 (emergency)

Kern County Sheriffs Department Communications **(661)861-3110**

CHP Communications **(661)864-4400**

Red Cross **(661) 324-6427 or**
(888) 765-7147 (Disaster After Hours)

Table 35: Radio Frequencies

Frequencies Receive			Transmit	Tone
Tactical TAC	2 168.200		168.200	
Helicopter Air-to-Ground	170.000		170.000	
Command	SQF Channel 2 Tone 4	168.675	168.675	4
Traffic Control	Shared Project	168.350	168.350	

¹⁸ Other emergency contact numbers are found on page 181.

Structure Protection

The following information is a checklist for fire protection resources working in the wildland urban interface. It is a mental reminder of factors that should be reviewed prior to committing resources to the task of structure protection. It is from the National Wildfire Coordinating Group's Fireline Handbook NFES number 410-1, Chapter 6-Urban Interface with minor amendments for Alta Sierra.

Wildland /Urban Interface "Watch Out" Situations for Structure Triage

Firefighter **safety** is the **primary consideration** when evaluating whether a structure can be protected.

Three categories of structures:

- Those that are not threatened.
- Those that are threatened and have the potential of being saved.
- Those that are not able to be saved and too dangerous to protect.

Factors to consider during structure triage:

- **FIRFFIGHTER SAFETY**
- Safety Zone Availability (is there time to prepare a safety zone?)
- Proximity of the fuels and predicted flame length to structure (no defensible space).
- Position on slope relative to fire spread.
- Fire behavior and intensity (the greater the intensity, the wider the defensible space needed).
- Flammability of roof and siding (wood roof and siding, vinyl siding, along with inadequate defensible space may make structure impossible to protect).
- Timing and available resources (not having time to position resources or lack of resources to protect structure).

An attempt to save a structure may be unsuccessful or too dangerous if:

- There is no safety zone and refuge available.
- There is no place to park engine safely.
- Fire is making a sustained run and there is little or no clearance.
- Fire behavior is extreme: spot fires are numerous and out pacing control.
- Water supply will not last as long as the threat.
- Fire's intensity dictates you leave the area **NOW**.
- Roof is more that $\frac{1}{4}$ involved with active fire.
- Fire inside structure, windows broken, and windy conditions.
- You cannot safely remain at the structure and your escape route could become not longer safe to use.

If a structure becomes well involved, leave it and move on to one that can be saved.

Structure Assessment Checklist

Address/Property Name

- Numerical street address, ranch name, etc.
- Number of residents on site

Road Access

- Road surface (paved, gravel, unimproved, dirt)
- Adequate width, vegetation clearance and safety zones along road
- Undercarriage problems (4x4 access only)
- Turnouts and turnarounds
- Bridges (load limits)
- Stream crossings (approach angle, crossing depth and surface)
- Terrain (road slope, location on slope-near chimneys, saddles, canyon bottom)
- Grade (greater than 15%)

Structure/Building

- Single residence or multi complex, out building (barn, storage)
- Does building have unknown or hazardous materials?
- Exterior walls (stucco or other noncombustible, wood frame, vinyl, wood shake)
- Large unprotected windows facing heat source
- Proximity of any above ground fuel tanks (LPG, propane, etc.)
- Roof material (wood shake, asphalt, noncombustible)
- Eaves (covered with little overhang, exposed with large overhang)
- Other features (wood deck, wood patio cover and furniture, wood fencing)

Clearances/Exposures/Defensible Space

- Structure location (narrow ridge, canyon, midslope, chimney)
- Adequate clearance around structure-minimum of 100' (steeper the slope the more clearance required)
- Surrounding fuels (larger, denser the fuels, the more clearance required)
- Flammable fuels (trees, ladder fuel, shrubs) adjacent to structure (is there time for removing these fuels?)
- Other combustibles near structure (wood piles, furniture, fuel tanks)
- Is there adequate clearance around fuel tank?
- Power lines or transformers (**DO NOT** park under lines)

Hazardous Materials

Anticipate these materials in garages or sheds

- Chemicals (Look for DOT/NFPA/UN symbols)
- Pesticides and herbicides
- Petroleum products
- Paint products

Estimated Resources for Protection

- Number(s) and type(s) of engines, water tenders, crews, dozers (General Guidelines: one engine per structure, one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. This formula will be used to estimate resource needs for each structure protection group.
- Type and number of aircraft available. Do not rely on aircraft to support a structure protection plan.

Structure Protection Guidelines

- **DO NOT** enter a structure unless you are trained, equipped, and authorized. If safe, a structure can be used as refuge. Firefighter safety and survival is the number one priority. Supervisors must keep in close communication with those you supervise and adjoining forces in the area.

Equipment Placement

- Identify escape routes and safety zones and make them known to all crew members.
- ALWAYS STAY MOBILE and wear all of your personal protective equipment (PPE).
- Back equipment in for quick escape.
- Mark entrance to long driveways to show that protection is in place (*very important* when structure cannot be seen from road).
 - Multiple ribbons at end of drive on street
 - Ribbon/flagging across drive entrance
 - Sign
 - Other pre-determined signal
- Park in a cleared area (watch for overhead hazards).
- Protect your equipment (park behind structure, placing structure between equipment and fire front; be aware of spot fires occurring behind you).
- Watch for hazards (drop-offs, pot holes, above-ground fuel storage, chemicals, septic tanks).
- Keep egress route clear:
 - park extra equipment on street if doing so does not block egress
 - keep hose off driveway
- Have an engine/crew protection line charged and readily available.
- DO NOT make long hose lays.
- Try to keep sight contact with all crewmembers.

Water Use Guidelines

- Keep at least 100 gallons of water reserve in your tank.
- Top off tank at every opportunity; use garden hose.
- Draft from creeks and fishpond.
- STAY MOBILE. Do not hook up to hydrant except to refill tank. (Hydrants should work because they are gravity fed.)
- CONSERVE WATER, avoid wetting down an area.
- Apply water only if it controls fire spread or significantly reduces heating of structure being protected.
- Keep fire out of the heavier fuels.
- Extinguish fire at its lowest intensity, not when it is flaring up.
- Knock down fire in the lighter fuels.
- Have enough water to last duration of main heat wave and to protect crew.

Class A Foam Use Guidelines

- Direct Attack - apply to base of flame.
- Indirect Attack - lay out wet line and burn out.
- Apply to structure (roof and siding) 10-15 minutes before fire arrives.
- Consider ordering a Gel unit to apply pretreatments to structures. Gel can be applied by special ground units and aircraft.

Preparing Structure

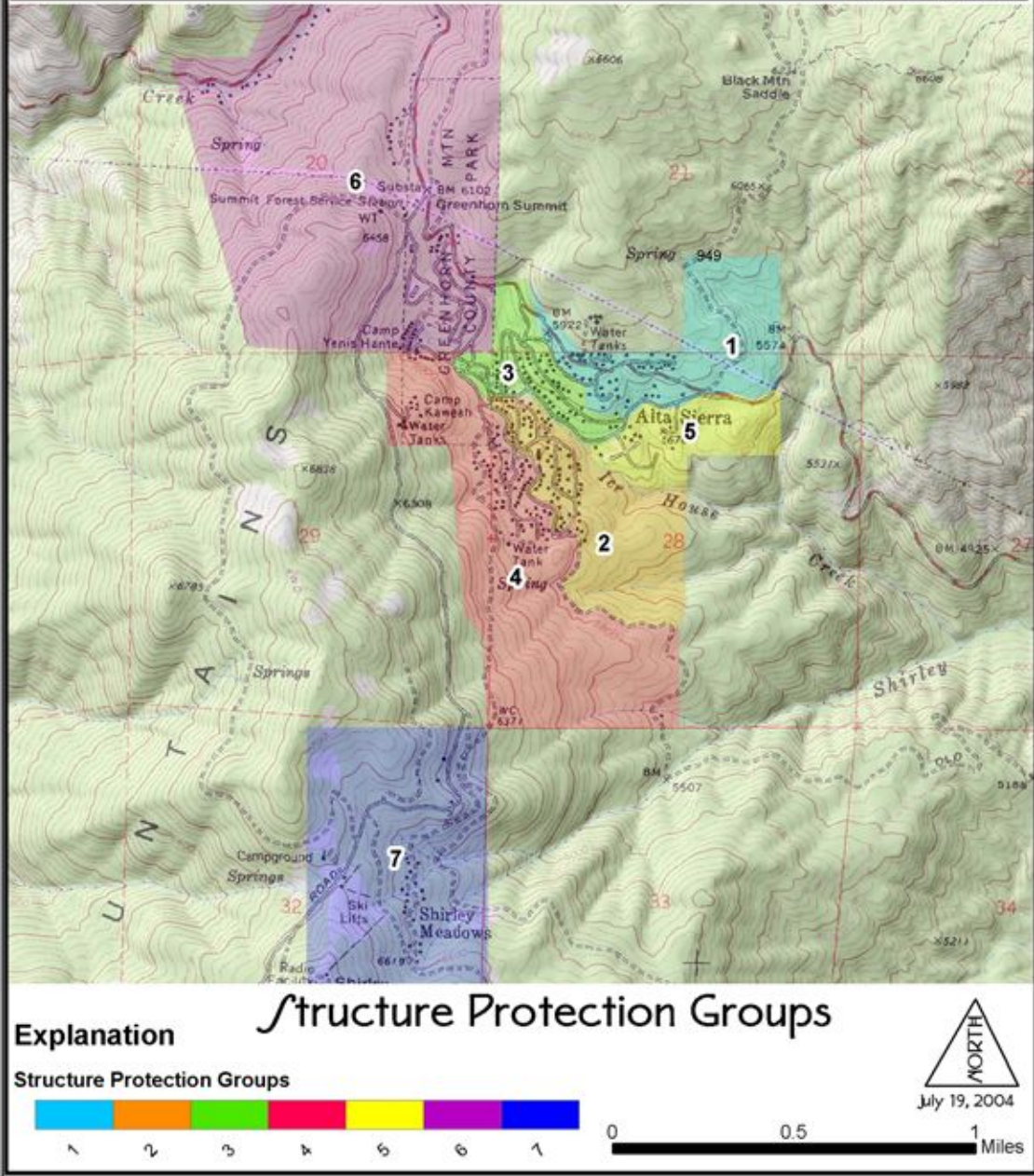
- Determine if residents are home (legal responsibility for evacuation lies with law enforcement). If residents remain on-scene, advise them to use structure if it is safe to do so as refuge when fire arrives.
- For roof access, place owner's ladder at a corner of structure on side with least fire threat and away from power drop.
- Clean roof of leaves, needles, and any other combustible materials.
- Cover vents and air conditioning unit on roof.
- Remove and scatter away from structure:
 - over-hanging limbs.
 - ground/ladder fuels to prevent fire from moving into the crowns.
 - wooden fences and wood piles near structure.
- Clear area around aboveground fuel tank, shutting off tank.
- Place combustible outside furniture inside structure.
- Close windows and doors, including garage, leaving unlocked. **AS A LAST RESORT, YOU MAY NEED TO USE THE STRUCTURE AS REFUGE.**
- Have garden hose(s) charged and place strategically around structure for immediate use.

Structure Protection Groups

In the event of fire threatening Alta Sierra, tactics dictate that the community is broken down into geographic areas for span of control. The geographic areas will be designated as structure protection groups and numbered to avoid confusion with area or street names. Seven groups are mapped showing the structure addresses. The number of cabins/dwellings and vacant lots are included for each group. There is a histogram for aspect and slope that displays the hazard associated with each group. Each group will have a recommended resource request for the number of fire engines and other resources. Please see Map 22 for all of the structure protection groups.

Map By:
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Alta Sierra Community Fire Safe Plan



Map 22: Structure Protection Groups Map

Structure Protection Group 1

General Area:

Structure Protection Group 1 consists of the northeastern portion of the Community.

Number of Homes

60 Cabins or Primary Dwellings...There is a home under construction below 949 Alta Sierra (North of Highway 155) and another in the planning phase. To access this structure, take the fork to the east (right) as seen on the map.

Number of Vacant Lots

34 Non-Government Owned Lots...The group is bordered to the north and east by large parcels of Forest Service land.

Streets

- Eastern and Upper Alta Sierra (up to Anglin's House 949 Alta Sierra)
- Highway 155/Evans Road
- Charlott Drive
- Locus Drive
- Eastern Laurel Drive
- Ponderosa Drive

Aspect

As seen by Chart 17, the majority of the slopes are facing the south. These hot slopes will host more brush species and pose more control problems.

Slope

As seen in Chart 18, the slopes within the group are moderately steep. Areas of concern for slope are below 949 Alta Sierra and South of the turnaround at the end of Ponderosa.

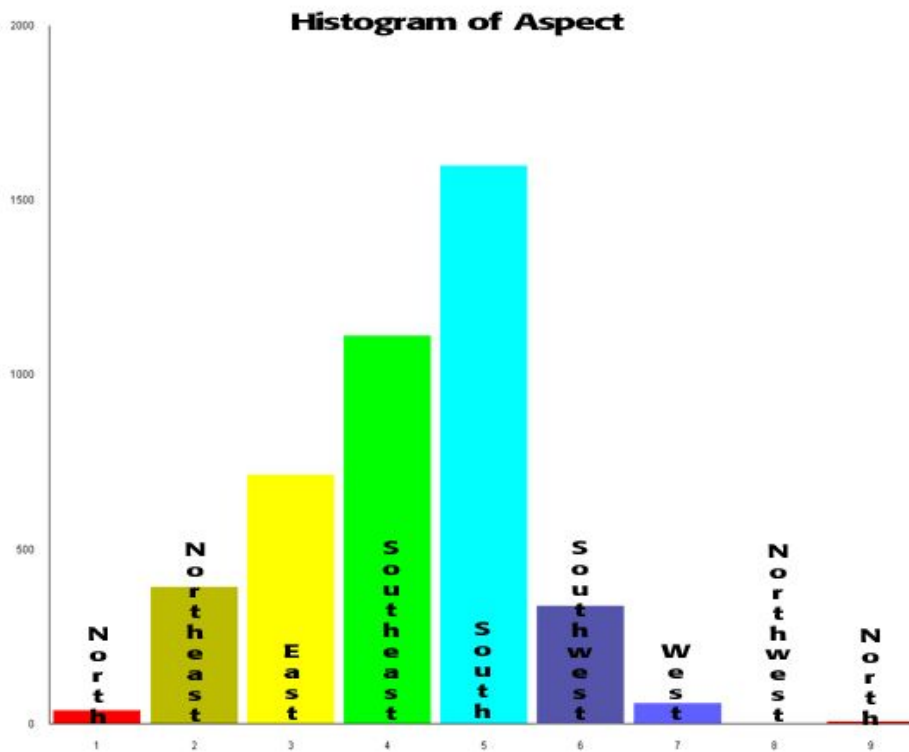


Chart 17: Histogram of aspect in Structure Protection Group 1.

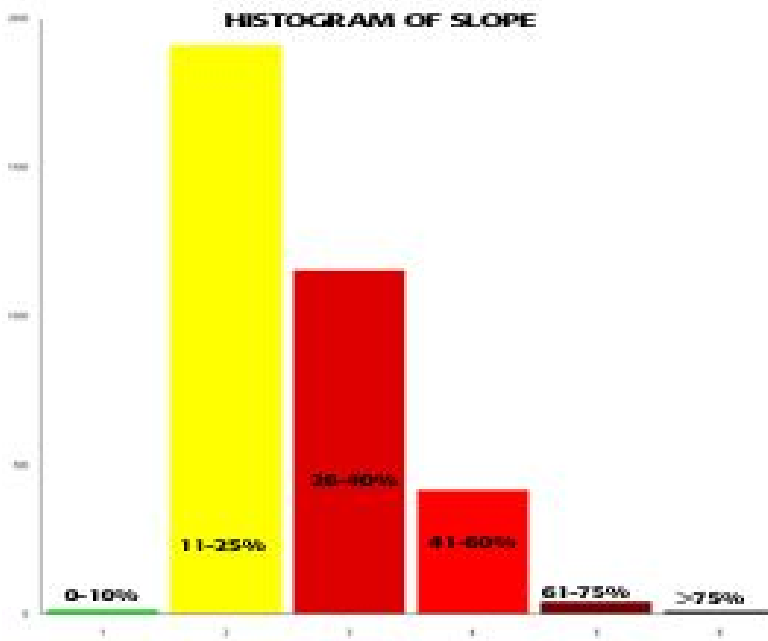


Chart 18: Histogram of slope indicates the majority of the slopes within the group are between 11-40 percent.

Access Issues

The road to 949 Alta Sierra is not marked due to Cal Trans restrictions on posting signs on their easements.

Access to 1516, 1520, and 1524 Evans Road have access by a common driveway off of Highway 155. May be able to perform a 3-point turnaround in driveway. Check prior to committing!

Access to 1686 and 1674 Locus is from a common driveway found in front of 1686 Locus. There is Manzanita lining the driveway that could pose fire intensity issues.

Access to 241, 1513, and 1517 Charlott is from a common driveway found in front of 1517 Charlott. Please see Map 23 for addresses within the group.

Access to 5801 and 5789 Evans Road is from a common driveway found east of 5789 Evans Road. The road is not paved.

Hydrant Information

Most of the hydrants in the group are red standpipes.

Hydrants located southeast of the group on Alta Sierra Road and Jay Way have the best capabilities in the Community. They are painted orange and have 4.5 inch outlets.

Control Issues:

Powerline fuel modification should be wide enough to bring a crown fire back to the ground due to the break in contiguous canopy cover. In its current condition, the fuel break will not stop a fire from continuing to burn. The fuel modification has removed the trees but surface fuels, such as grass and brush, are beginning to encroach the break. If the fuelbreak is utilized for control lines, the surface fuels will need to be removed. The fuel modification increases the visibility of the powerlines but their presence should still be mentioned during pilot briefings.



Figure 33: The fuel modification under the high-tension powerlines ranges between 60-80 feet wide. Photo by Timothy Walsh.

Highway 155 is the widest road in the Community averaging 60 plus feet. It is two lanes with paved shoulders that will be a sound anchor point for any fire suppression operation. The highway will need to be closed for firefighter and public safety if used for a control line or if smoke causes visibility concerns.

There are 10 vacant parcels in the center of the Structure Protection Group One. A home is under construction (5849 Evans?) in the center of the vacant properties. Vacant lots should be pretreated with small trees and ladder fuels removed.

The abandoned structure between 10920 and 10820 Laurel could pose a serious threat to homes in the near vicinity. There is a hole in the roof that is susceptible to firebrands. An engine will need to provide protection and board up the roof if material can be found.

Fuels have been significantly reduced behind Charlott and Locus Drives but slash piles need to be removed. At the time of this writing, hundreds of slash piles surround the community on Forest Service property.



Figure 34: This photo is behind 1686 Locus showing slash piles and the excellent defensible space behind the structures. Trees have been thinned and the ladder fuels were removed. There is a good turnaround behind 1674 Locus. Photo by Timothy Walsh.

Dead and down fuel loading below 949 Alta Sierra is extremely heavy do to bug kill! There is a new home under construction and another lot being cleared for construction. These homes are in close proximity to this fuel problem.



Figure 35: An example of how heavy the dead and down fuel is below 949 Alta Sierra. Fire intensity and burn out time will be extreme! Photo by Timothy Walsh.

Logging decks and lumber debris will need protection at the small diameter lumber mill at 949 Alta Sierra. The home at 949 Alta Sierra has very good thinning below it. Further to the east is the heaviest fuel loading on the mountain as seen in Figure 35. Tree mortality in this area is high to extreme as numerous trees are showing red needles.



Figure 36: The small diameter lumber mill located at 949 Alta Sierra will need a separate engine for protection. Lumber decks should be pretreated with gel or foam. Photo by Timothy Walsh.



Figure 37: The thinning below 949 Alta Sierra makes this structure more defensible from a fire burning upslope. The improved canopy spacing should force a crown fire to the ground. Photo by Timothy Walsh.

Resource Request

Resource needs are based on the formula of one engine per structure plus one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. Type 1 or 2 engines should not be requested because as the incident changes, there will be tendency to place them on streets where widths and turnarounds are not adequate. As tree mortality continues to spread, more resources may be needed for adequate protection¹⁹.

Handcrew orders are based on strategic needs. Crews on Upper Alta Sierra can fall dead standing trees and prep the structures and lumber mill. On Evans Road, a crew can pre-treat the vacant lots between 5977 and 5801. Crews could also prep and pre-treat the areas north of Charlott and Locus Drives.

Another consideration should be the installation of a hard pipe sprinkler system. Rain for Rent²⁰, a commercial firm specializing in irrigation and emergency water handling equipment, could bring in pipe, sprinklers, and pumps to set up a system behind Locus and Charlott Drives. This system would need 2,000 feet of pipe to reach from the water tank at 6050 Evans Road to 1501 Charlott Road. The system could be started from the water tank and abandoned if fire conditions become intolerable.

¹⁹ In the event of a crown fire, **no amount** of resources will protect the community!

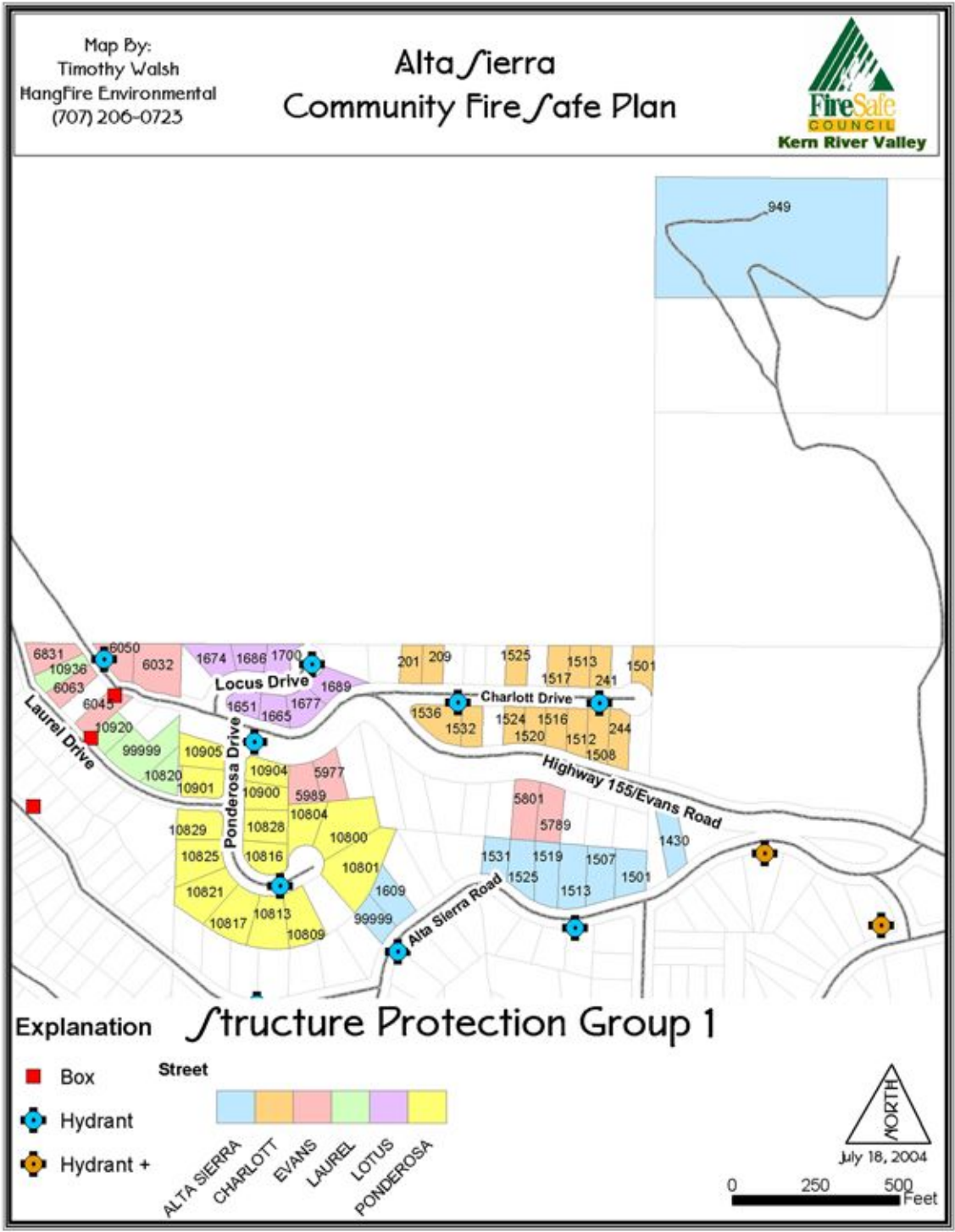
²⁰ <http://www.rainforrent.com> or Phone Office: 661-399-9124

Table 36: Resources needed for Structure Protection Group 1

Street Structures		Engines	Handcrews	Water Tenders²¹
Upper Alta Sierra	3	3 ²² 1 1		
Alta Sierra Road	9	6	0	1
Evans Road/East Laurel Drive	11 8 1 1			
Charlott Drive	15	10	0	1
Locus Drive	7	5	1	
Ponderosa Drive	15	8		
Group Total	60 40 3 4			

²¹ Type 2 Water tenders are recommended / (1000 gal with short wheelbase)

²² This number represents an additional engine that is needed for the lumber mill and the house that is under construction below Dan Anglins.



Map 23: Structure Protection Group 1-All addresses displayed as 99999 are not known or posted. Hydrants shown in orange have 4.5-inch outlets.

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 1 Aerial Photograph

Explanation

 Structure Protection Group 1

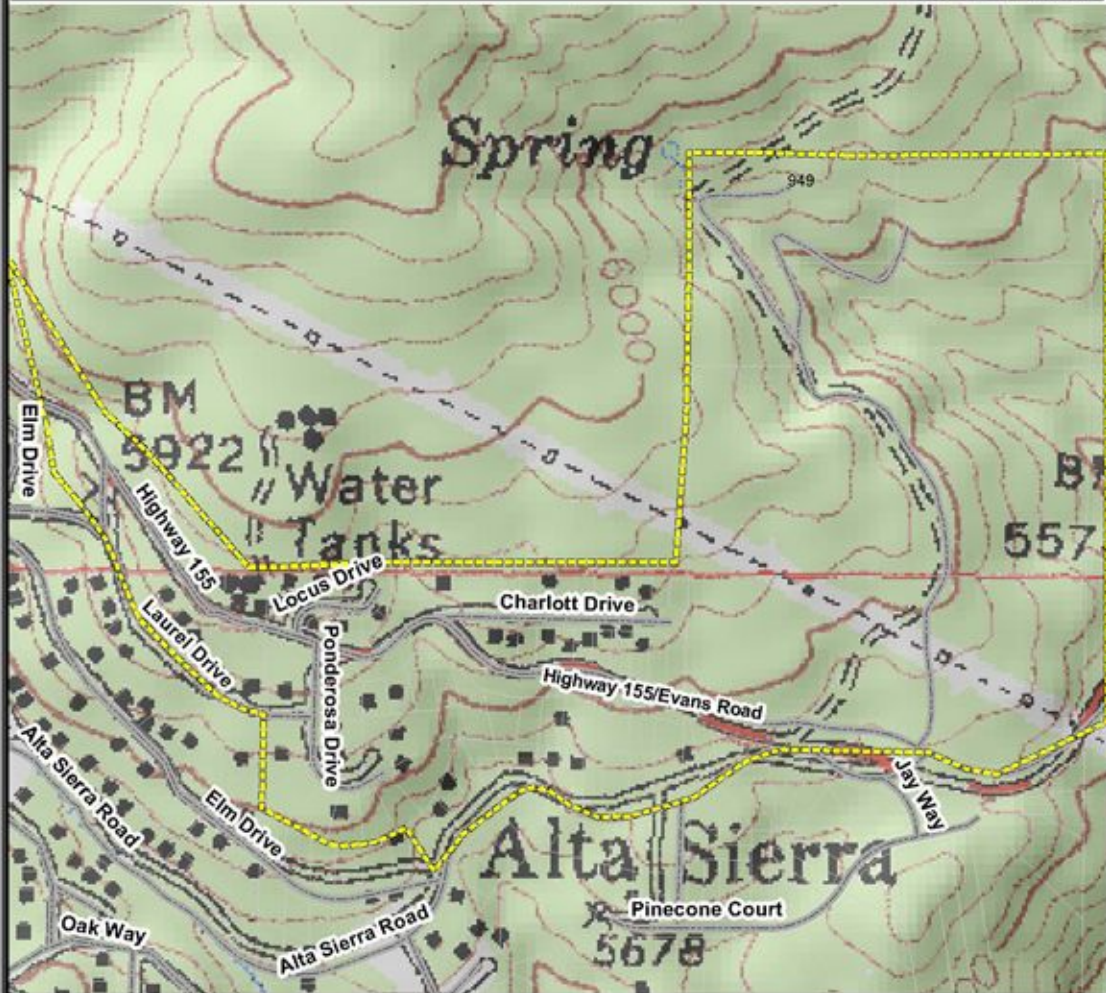
0 500 1,000 Feet



Map 24: Structure Protection Group 1 Aerial Photograph. Notice the powerline fuel modification and how it becomes overgrown to the northwest and southeast.

Map By:
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HangFire Environmental
(707) 206-0723

Alta Sierra Community Fire Safe Plan



Structure Protection Group 1 USGS Topographic Map

Explanation

 Structure Protection Group 1

0 500 1,000 Feet



Map 25: Structure Protection Group 1 USGS 7.5 Minute Topographic Map.

Structure Protection Group 2

General Area:

Structure Protection Group 2 consists of the area south of Alta Sierra Road and east of Old State Road.

Number of Homes

81 Cabins or Primary Dwellings.

Number of Vacant Lots

50 Non-Government Owned Lots. There is a 50-acre vacant lot that parallels Spruce Road to the east.

Streets

- Middle section of Alta Sierra Road
- Fir
- Juniper Road
- Oak
- Old State
- Northern section of Pine
- Spruce
- South side of Willow

Aspect

As seen by Chart 19, the majority of the slopes are facing the north, northeast and east. These cooler slopes receive the greatest amount of solar heating during the early morning hours. They will become shaded early in the afternoon supporting higher fuel moistures. These slopes will have the heaviest fuel loading compared to other aspects.

Slope

As seen in Chart 20, the slopes within the group are moderately steep. Areas of concern for slope are south of Ice House Creek below Fir and Spruce Drives.

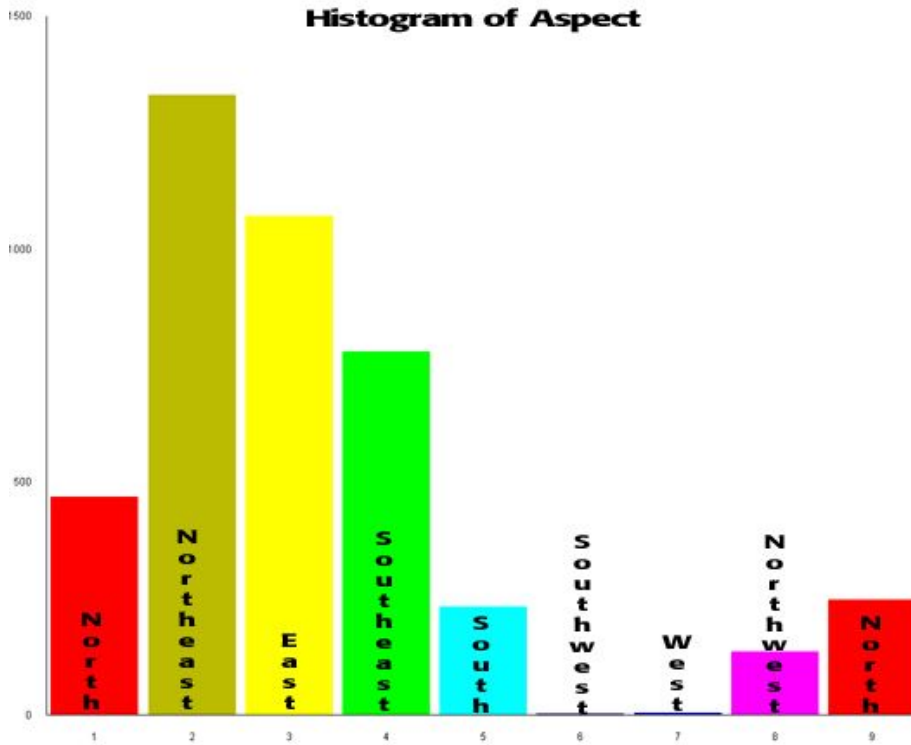


Chart 19: Histogram of aspect in Structure Protection Group 2.

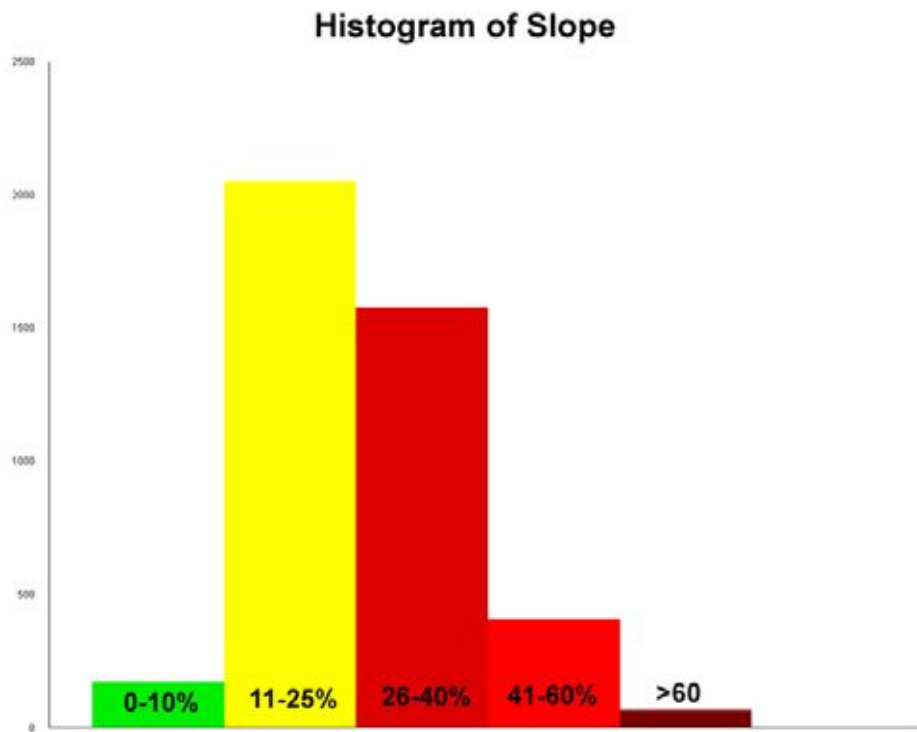


Chart 20: Histogram of slope indicates the majority of the slopes within the group are between 11-40 percent.

Access Issues



Access to 10800 and 10828 Oak is from Alta Sierra over a bridge. Bridge will not support heavier fire apparatus. 1800, 1804, 1822 Alta Sierra Road do not have a driveway to access. All access is from narrow walkways over the creek or from behind structures using Fir or Oak Way.

Roads are very narrow within this structure protection group. Oak, Fir, and Spruce Drives should be scouted with a pick-up truck prior to committing engines.

Fir Road narrows at 1766 to the point of possible inaccessibility! A tree should be removed as seen in Figure 38.

Figure 38: Narrow road access near 1766 Fir. Photo by Timothy Walsh.

Hydrant Information

All of the hydrants in the group are red boxes and cannot be relied on for water supply.

7925 and 7928 Old State Road have 5000 gallon water tanks on site.

Control Issues:

The structure located at 10880 Oak Way may provide safe refuge during adverse fire conditions. There is a large area void of vegetation west of the structure. The house is built with heavy log construction with a metal roof.



Figure 39: The structure located at 10880 Oak Way offers a large area of defensible space and no slope. One safety concern is the large tree leaning over the house and garage! Photo by Timothy Walsh.

Many small cabins that resemble sheds within the group are high risk and not defensible under moderate to extreme fire intensities.

There are condemned homes located south of 10620 and 10117 Juniper that poses a high hazard to homes surrounding it.

There is a bridge that provides access to three structures at 10800 and 10828 Alta Sierra Road with a 10-ton limit.



Figure 40: Small cabins that are condemned or should be will pose a risk to all of the structures around them. Photo by Timothy Walsh.

The structure at 7925 has a water tank on site for protection.

The thinning of trees below 8312 makes this home more defensible.

The structure at 8520 Old State access is off Spruce Drive over a bridge with unknown weight limits.

The old lodge is dilapidated and will pose a threat to surrounding homes during a wildfire. Small trees are growing under the overhang of the building. A small A-frame shack is covered in wood shingles and there are holes in the plywood used to secure the openings. Both buildings should be condemned or repaired. If the buildings were removed and trees thinned, then this parcel may provide an adequate safety zone within the community.



Figure 41: Small trees and piles of forest debris are under the eaves of the old lodge. During a wildfire, these combustibles may ignite the abandoned building. Photo by Timothy Walsh.



Figure 42: The small A-frame shack next to the old lodge needs to be razed. In its current condition, embers will blow in through the openings in the plywood or vent hole. Once ignited, burning wood shingles will travel several hundred feet threatening several neighboring structures. Photo by Timothy Walsh.

Resource Request

Resource needs are based on the formula of one engine per structure plus one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. Type 1 or 2 engines should not be requested because as the incident changes, there will be tendency to place them on streets where widths and turnarounds are not adequate. As tree mortality continues to spread, more resources may be needed for adequate protection²³.

²³ In the event of a crown fire, **no amount** of resources will protect the community!

Handcrew orders are based on strategic needs. Crews should pre-treat the structures removing all dead trees found within the group. Crews should thin and pre-treat the large parcels at the following locations:

- Large parcel that parallels Spruce Drive to the east
- The area along Ice House Creek
- Vacant parcels between 10632 Juniper and 1766 Fir
- Vacant parcels between 8650 and 8734 Old State Road
- The County Park west of Willow Drive

Another consideration should be the installation of a hard pipe sprinkler system. A commercial company could bring in pipe, sprinklers, and pumps to set up a system behind homes located on the east side of Spruce Drive. This system would need 1,400 feet of pipe to stretch from Alta Sierra Road to the south end of Spruce. A water tender or other large portable water tank will be needed to supply the system. Portable tanks up to 50,000 gallons are currently available for purchase²⁴. The sprinkler system could be started from the water tank and abandoned if fire conditions become intolerable.

Table 37: Resources needed for Structure Protection Group 2.

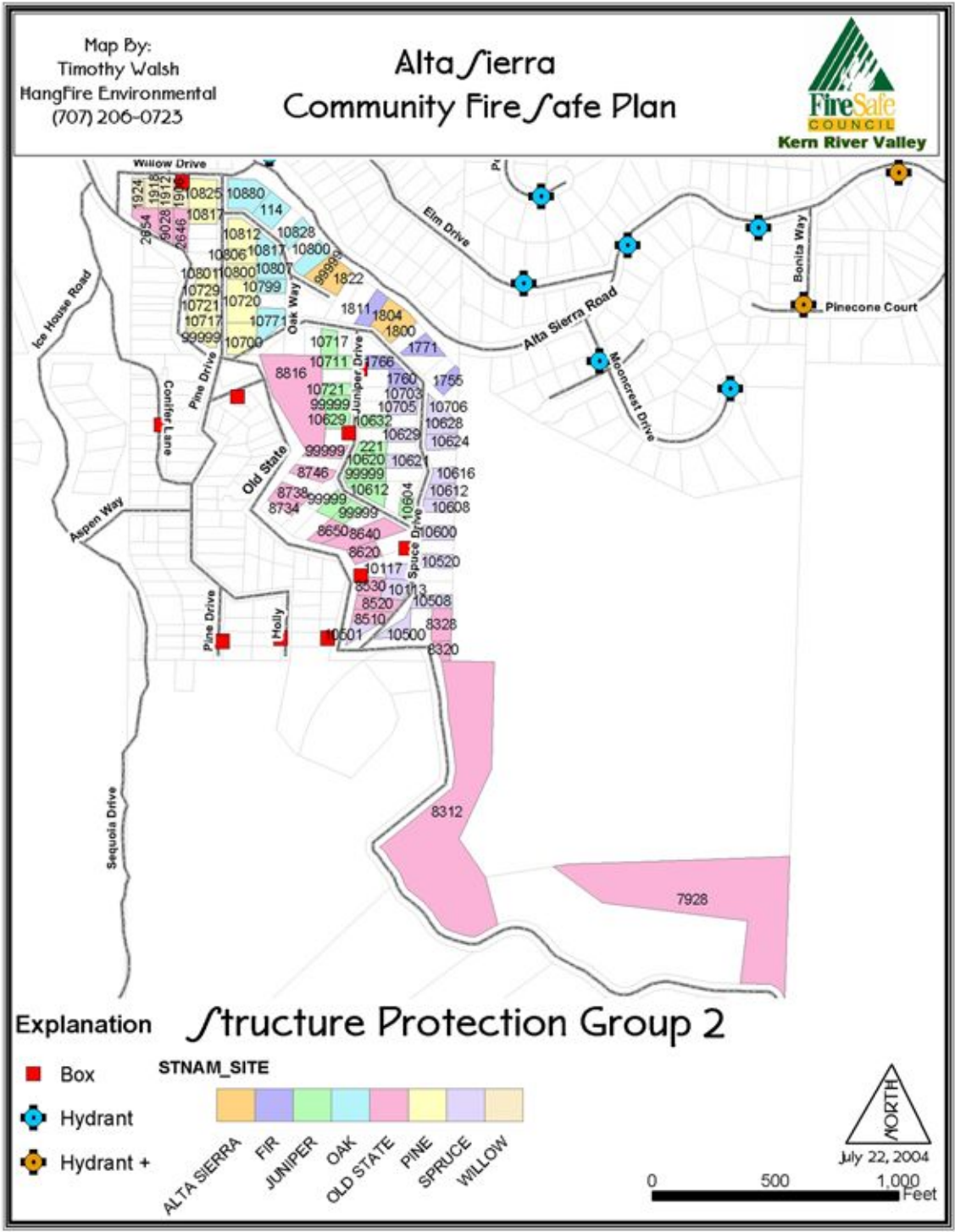
Street Structures	Engines	Handcrews	Water Tenders ²⁵
Alta Sierra/NE Fir/NE Oak ²⁶	11 8 0 2		
Spruce Drive/SW Fir ²⁷	19 16 1 3		
Juniper Drive	17	10	1 2
Upper Pine	12	10	0 2
S Willow/N Old State	7	4	1 1
Old State Road	15	11	1 2
Group Total	81 59 4 12		

²⁴ More information on pillow tanks can be found at:
http://www.interstateproducts.com/pillow_tanks.htm

²⁵ Type 2 Water tenders are recommended / (1000 gallon with short wheelbase)

²⁶ Houses that are located next to or across Ice House Creek.

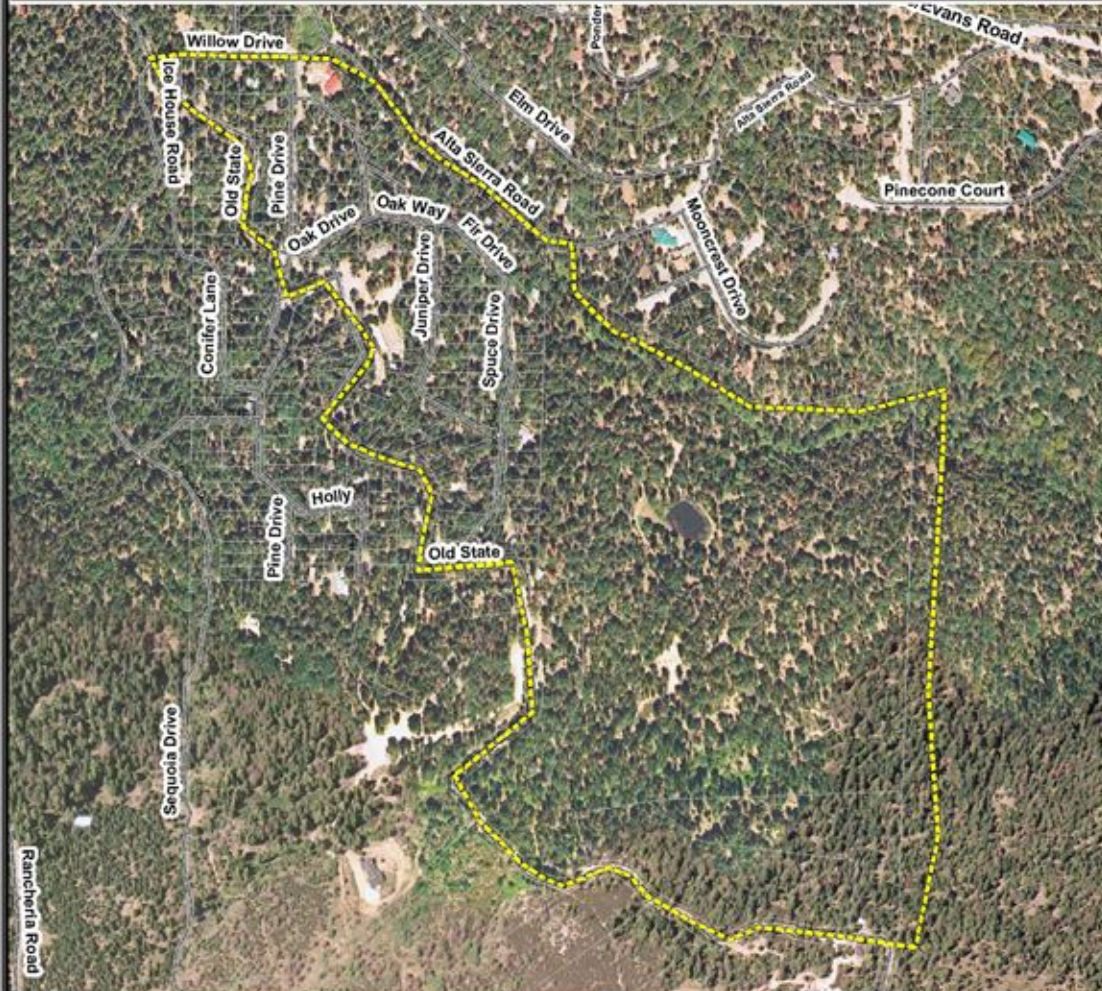
²⁷ This includes houses on Old State Road and Juniper with access from Spruce.



Map 26: Structure Protection Group 2-All addresses displayed as 99999 are not known or posted. Hydrants shown in orange have 4.5-inch outlets.

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 2 Aerial Photograph

Explanation

 Structure Protection Group 2

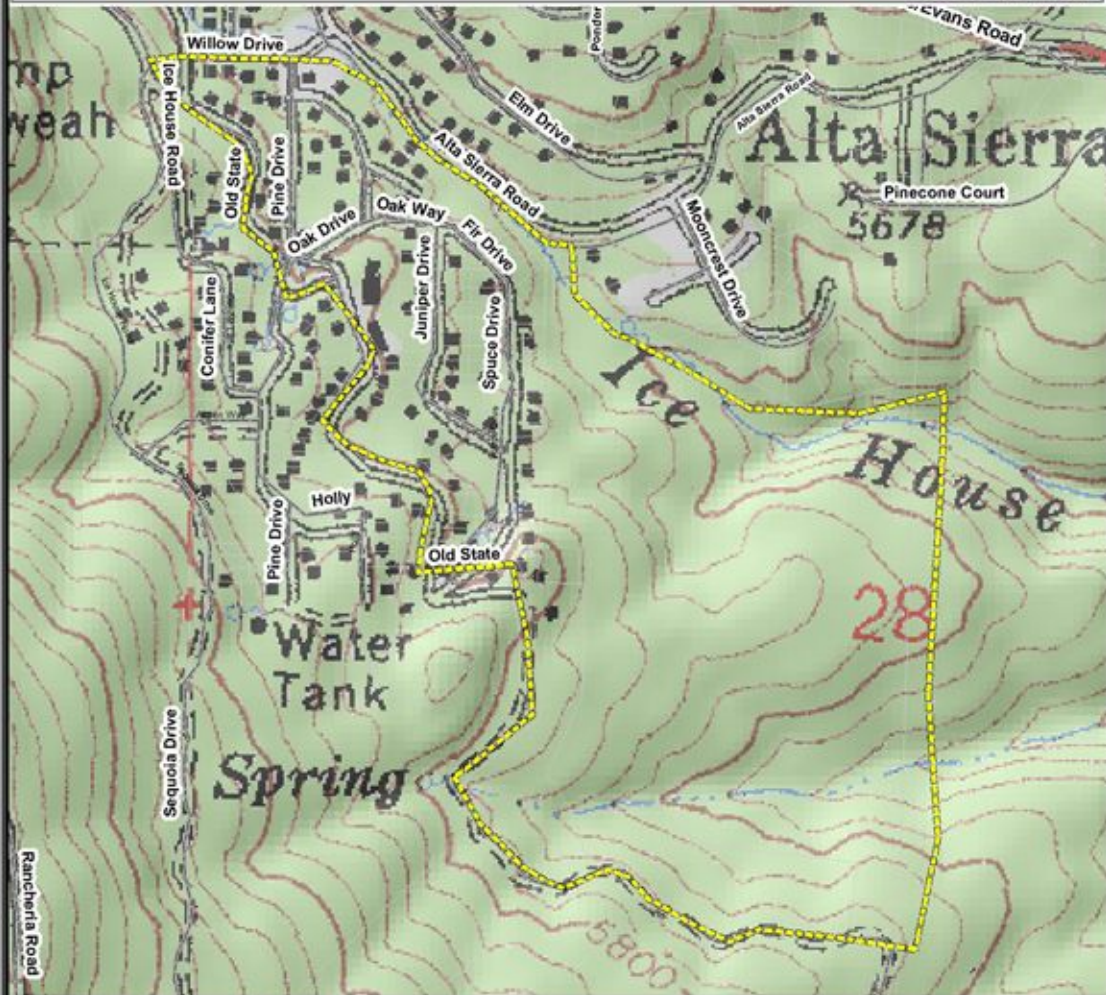


0 500 1,000 Feet

Map 27: Structure Protection Group 2 Aerial Photograph

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 2 USGS Topographic Map

Explanation

 Structure Protection Group 2



0 500 1,000 Feet

Map 28: Structure Protection Group 2 USGS 7.5 Minute Topographic Map

Structure Protection Group 3

General Area:

Structure Protection Group 3 consists of the area north of Alta Sierra Road and Willow Road and west of Laurel Road.

Number of Homes

74 Cabins or Primary Dwellings.

Number of Vacant Lots

33 Non-Government Owned Lots. The Structure Protection Group is bordered by the County Park to the west and United States Forest Service property to the north.

Streets

North side of Willow
Cedar
North side of Alta Sierra Road west of Elm
Elm Drive
South side of Laurel
Northern section of Pine

Aspect

As seen by Chart 21, the majority of the slopes are facing the dry south and southwest. These slopes receive the most solar radiation over the course of the day. They will have the lowest fuel moistures and heavier vegetation will continue to burn longer into the burning period than other aspects.

Slope

As seen in Chart 22, the slopes within the group are moderately steep. The steepest slopes are found between Alta Sierra Road and Elm Drive, specifically between 10817-10921 Elm.

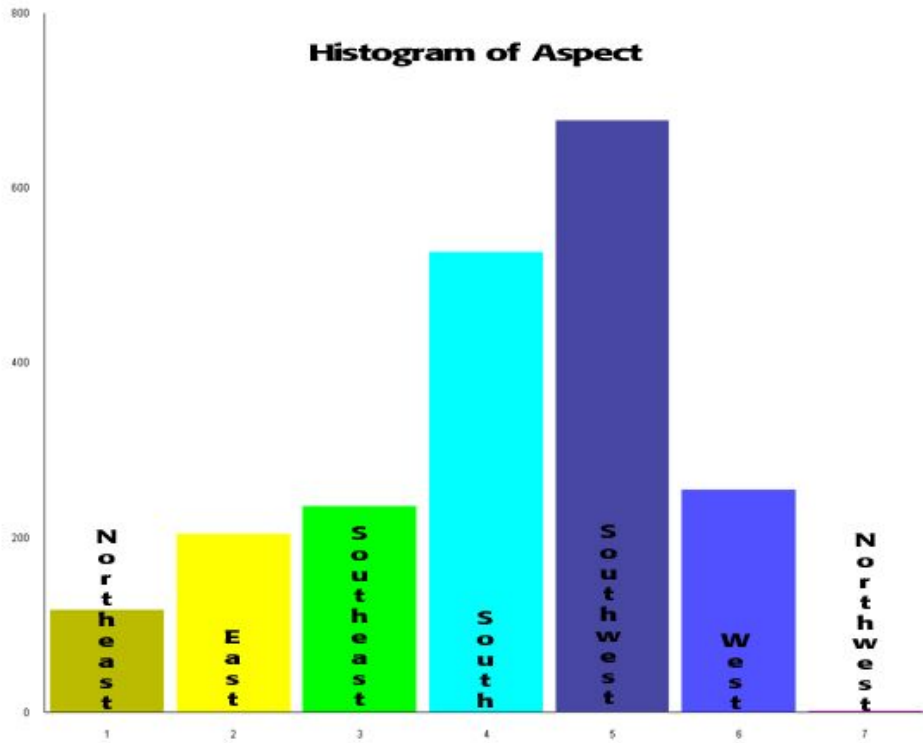


Chart 21: Histogram of aspect in Structure Protection Group 3.

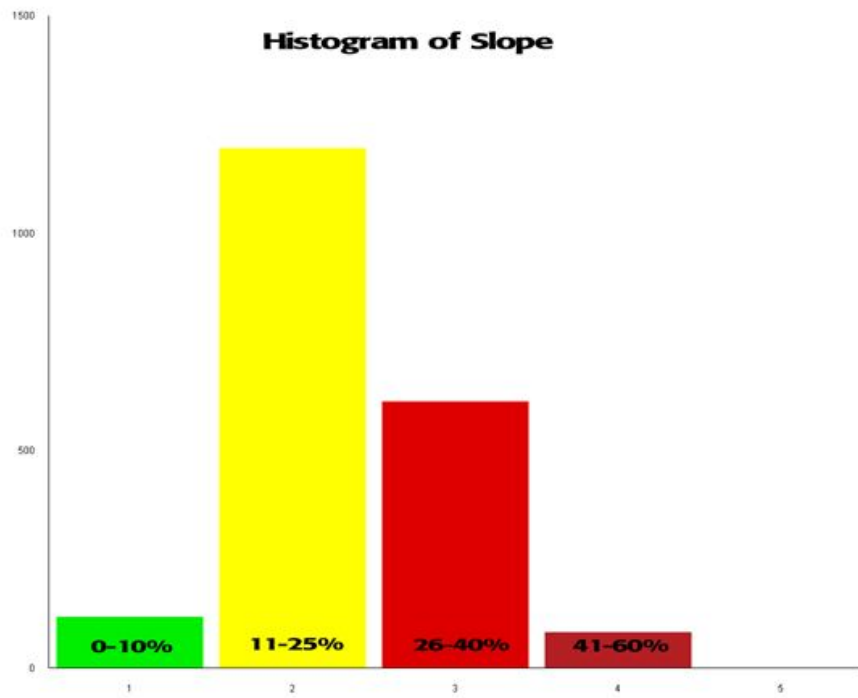


Chart 22: Histogram of slope in Structure Protection Group 3

Hydrant Information

Most of the hydrants in the group are red boxes and cannot be relied on for water supply.

Control Issues:

The greatest control issue is access! Cedar Drive, Alta Sierra Road and Elm Drive all converge at a single apex at the northern portion of the Structure Protection Group. It is very likely that engines, water tenders, and crew buggies will bottle neck in this area creating a very dangerous situation. All of the streets within this group are very narrow. Traffic control for all three of these streets is strongly recommended.

Vacant lots found between 151 and 10933 Laurel Drive have been cleared but moderate amounts of slash and logs were left on the ground.

The home found at 10812 Elm has a very long wood plank walkway. This walkway appears very unstable and could become a safety issue during structure protection.



Figure 43: The rickety plank boardwalk up to 10812 Elm was very unstable and could become worse during a wildfire. Photo by Timothy Walsh.

There is a small drainage next to 2043 Alta Sierra Road with very heavy amounts of dead and down woody debris.

2043 Alta Sierra Road has plastic tarps covering plywood that will most likely ignite during a wildfire. There is wood stored under and behind the tarps.



Figure 44: 2043 Alta Sierra Road is susceptible to ignition with plastic tarps covering plywood and wood stored under the covered porch. Photo by Timothy Walsh.

Access to 10726 Elm Drive is by a common unpaved driveway that parallels Elm Drive. Access to the driveway is found in front of 10704 Elm Drive.

Access to 10801, 10803, and 10807 Elm Drive is from an unpaved driveway that starts at 10809 Elm and ends east of 1735 Alta Sierra Road. The three homes appear to be located on Alta Sierra Road but have Elm Drive addresses.

If fire becomes established in Ice House Creek, it will run upslope and threaten the homes on Elm Drive and Laurel Drive.

Several piles have been created by the thinning of Forest Service Land found at the northern boundary of this group.



Figure 45: The northern boundary of this group has been thinned with the ladder fuels removed. Debris is in hundreds of piles found at the upper end of Cedar, Elm, Laurel Drives, and Alta Sierra Road. Once the piles are burned, the area will provide less available fuel. Photo by Timothy Walsh.

Resource Request

Resource needs are based on the formula of one engine per structure plus one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. Type 1 or 2 engines should not be requested because as the incident changes, there will be tendency to place them on streets where widths and turnarounds are not adequate. As tree mortality continues to spread, more resources may be needed for adequate protection²⁸.

Handcrew orders are based on strategic needs. Crews should pre-treat the structures removing all dead trees found within the group. Crews should thin and pre-treat the large parcels at the following locations:

Three vacant parcels between 10933 and 151 Laurel Drive.

The vacant parcels between 10713 and 10809 Elm Drive.

The County Park west of Willow Drive.

The area north of the Structure Protection Group has been thinned and ladder fuels removed. If piles still exist, they must be treated with foam or pretreatment gel.

Another consideration should be the installation of a hard pipe sprinkler system. A commercial company could bring in pipe, sprinklers, and pumps to set up a system behind homes located on the west side of Cedar Drive on the County Park property. This system would need 1,000 feet of pipe to stretch from Willow Road north paralleling Cedar Drive. A water tender or other large portable water tank will be needed to supply the system. Portable tanks up to 50,000 gallons are currently available for purchase²⁹. The sprinkler system could be started from the water tank and abandoned if fire conditions become intolerable.

Table 38: Resources needed for Structure Protection Group 3.

Street Structures	Engines	Handcrews	Water Tenders ³⁰
Cedar/Willow 15	9 1 3		
North side Alta Sierra/Elm ³¹	20 16 1 4		
Elm Drive	32	20	1
South side of Laurel	7 5 1 1		
Group Total	74 50 4 12		

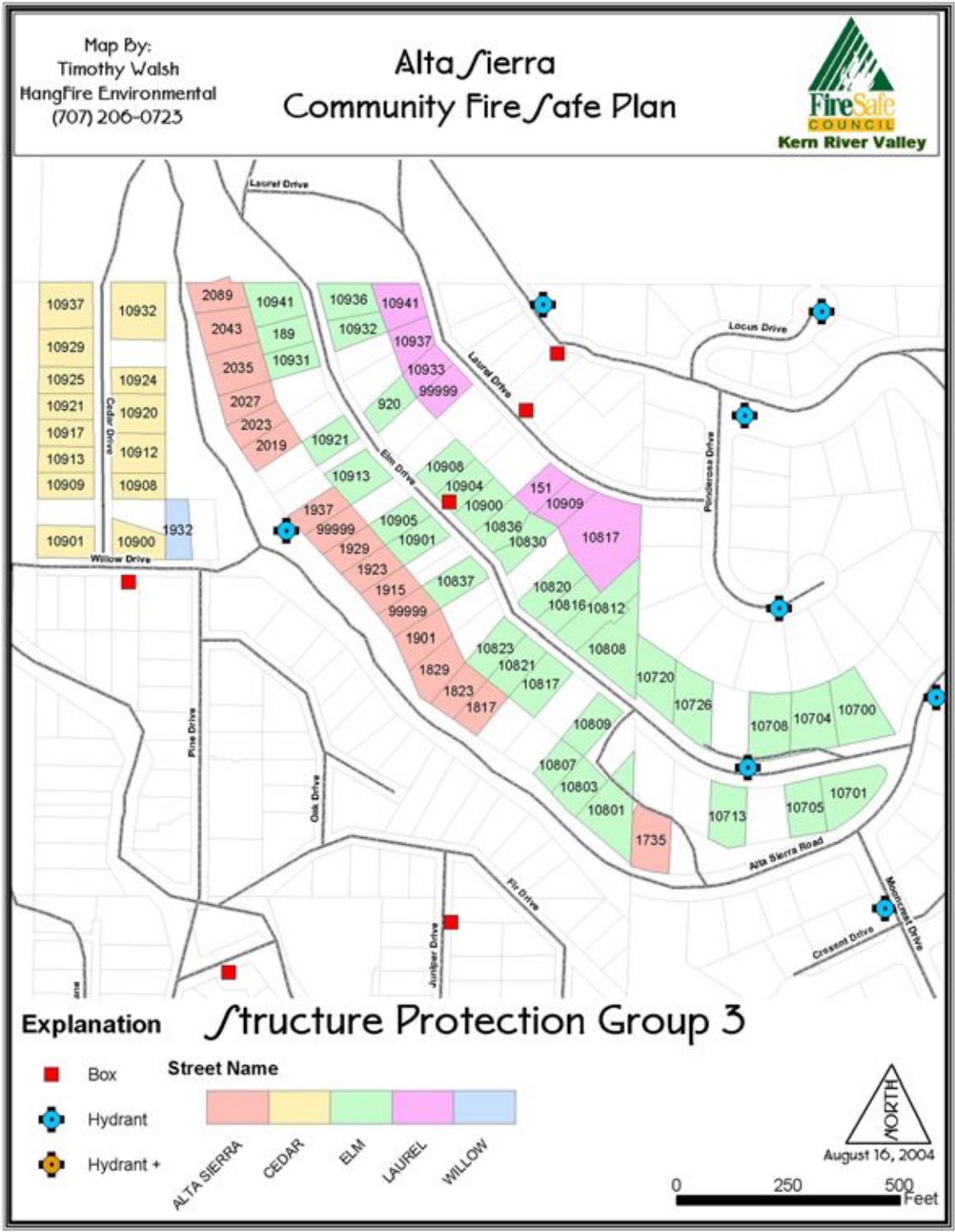
²⁸ In the event of a crown fire, **no amount** of resources will protect the community!

²⁹ More information on pillow tanks can be found at:

http://www.interstateproducts.com/pillow_tanks.htm

³⁰ Type 2 Water tenders are recommended / (1000 gal with short wheelbase)

³¹ The homes located at 10807, 10803, and 10801 Elm may have better access from Alta Sierra Road.



Map 29: Structure Protection Group 3-All addresses displayed as 99999 are not known or posted.

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 3 Aerial Photograph

Explanation

 Structure Protection Group 3

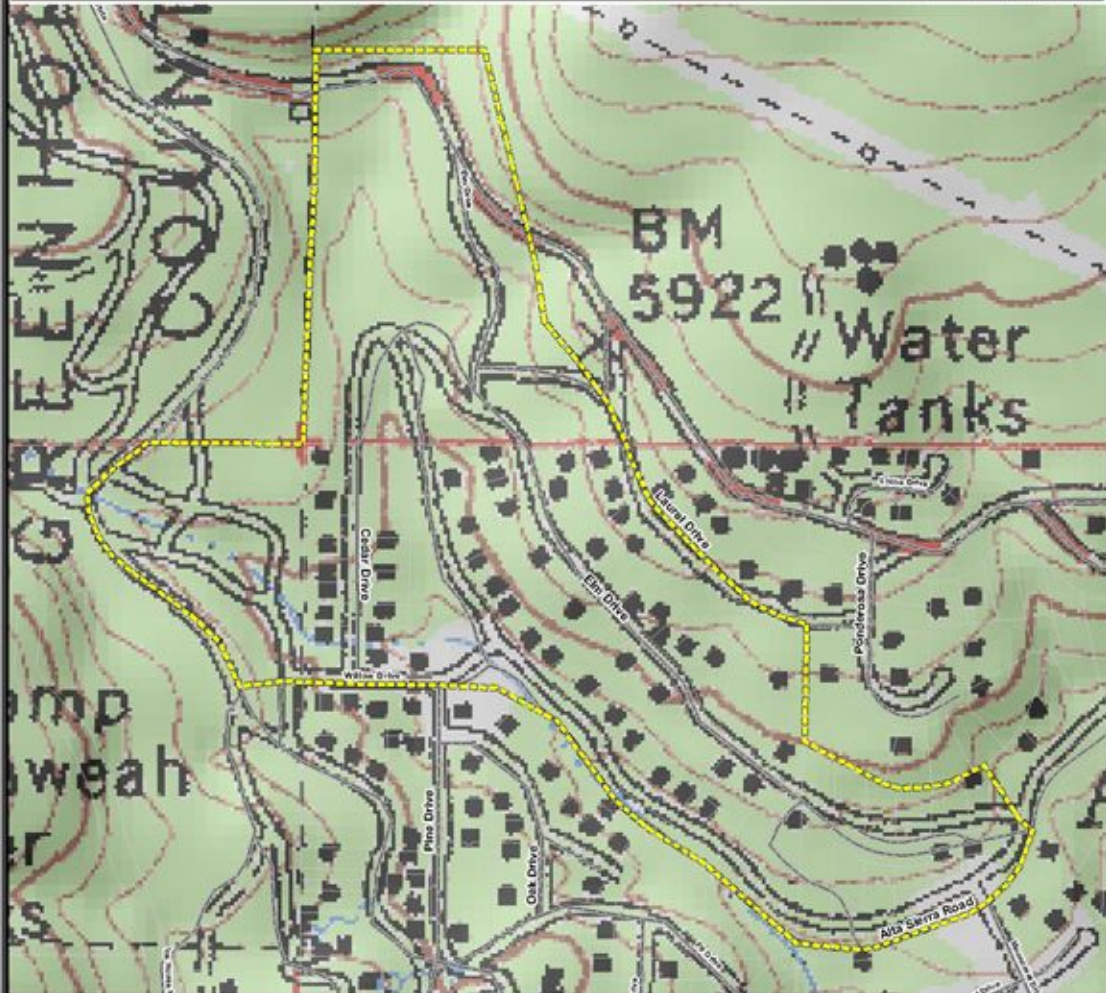


0 500 1,000
Feet

Map 30: Structure Protection Group 3 Aerial Photograph

Map By:
Timothy Walsh
HangFire Environmental
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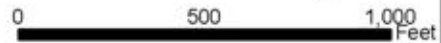
Alta Sierra Community Fire Safe Plan



Structure Protection Group 3 USGS Topographic Map

Explanation

 Structure Protection Group 3



Map 31: Structure Protection Group 3 USGS 7.5 Minute Topographic Map

Structure Protection Group 4

General Area:

Structure Protection Group 4 consists of the southwest corner of the study area.

Number of Homes

71 Cabins or Primary Dwellings.

Number of Vacant Lots

53 Non-Government Owned Lots. The Structure Protection Group is bordered by the County Park to the northwest and United States Forest Service property to the west, south, and east.

Streets

Ice House
Aspen
Conifer
Pine
Holly
Old State
Sequoia

Aspect

As seen by Chart 23, the majority of the slopes are facing the northeast and east. These slopes receive the most solar radiation during the early morning hours. They will become shaded in the early afternoon, especially the northern aspects.

Slope

As seen in Chart 24, the slopes within the group are steep. The steepest slopes are found west of Ice House and Rancheria Roads.

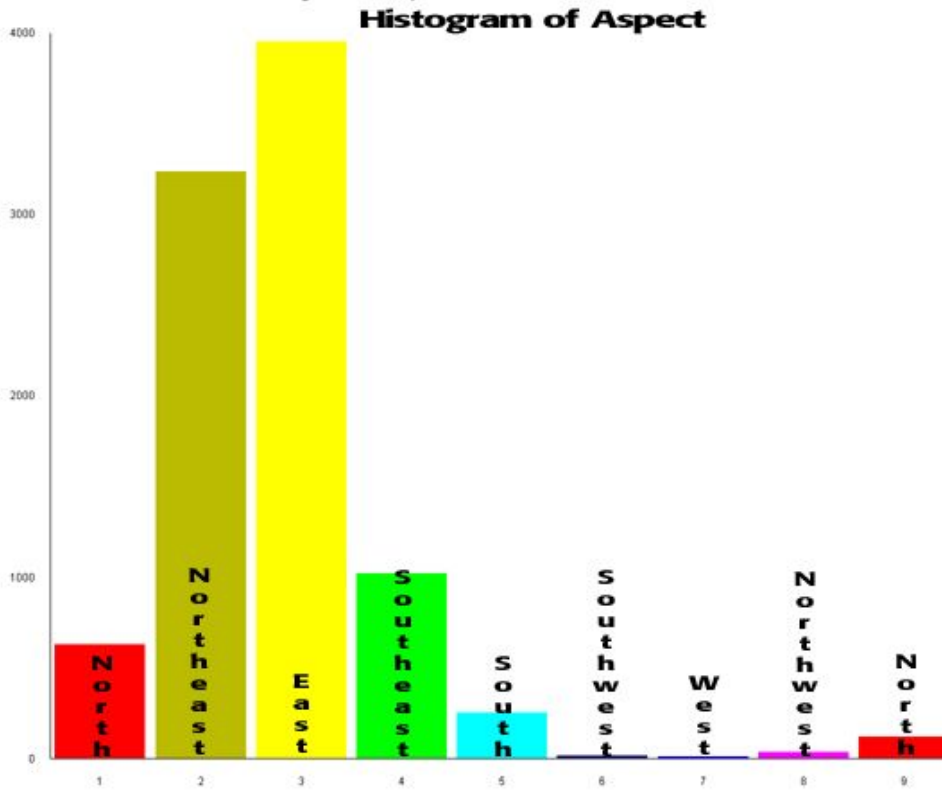


Chart 23: Histogram of Aspect in Structure Protection Group 4

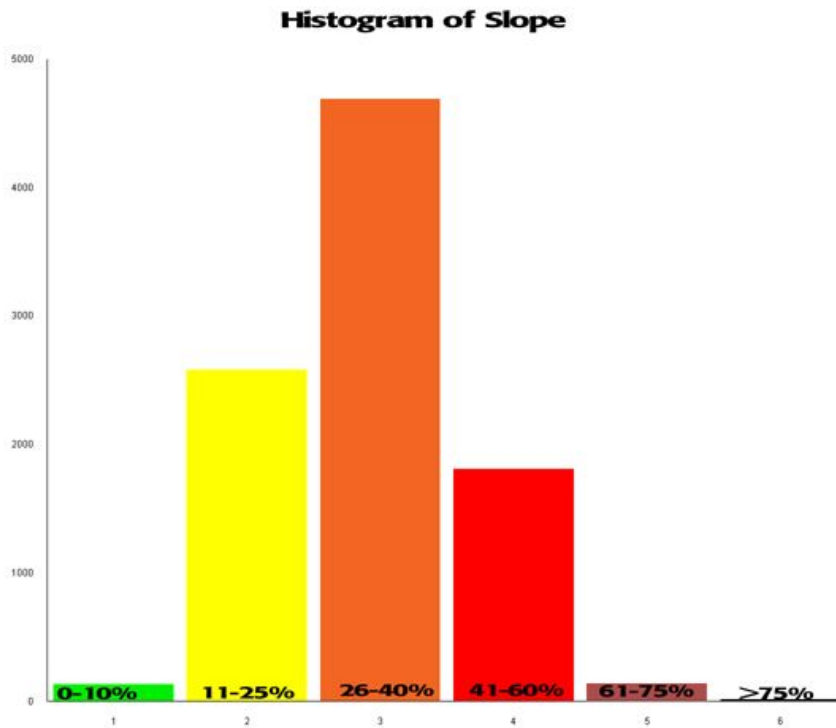


Chart 24: Histogram of Slope in Structure Protection Group 4.

Hydrant Information

All of the hydrants in the group are red boxes and cannot be relied on for water supply.

7925 Old State Road has a water tank on site for fire protection.

10124 Sequoia Road has a water tank, pump, standpipes, and perimeter sprinklers on site for fire protection.

Water tanks at the south end of Pine Drive may be tapped for water using the red box located at the end of Pine. There are no fire department connections on the tanks.

Control Issues:

One of the greatest control issues is access! All of the streets within this group are very narrow. Most maps of the area show the south end of Pine and Holly forming a loop. Gates have been installed making both roads dead ends. Engine companies protecting homes on these streets will have a long path of egress if fire conditions become intolerable. Traffic control for these streets is strongly recommended.

The other control issue is topography. This structure protection group is at great risk due to the high number of topographic chimneys that are present. Chimneys are formed where two slopes converge. They are referred to as chimneys because air is forced to compress as it flows through the convergence. Wind, superheated gases, and embers are forced through the chimney during wildfires making these areas particularly troublesome and dangerous. To visualize the chimneys, a hydrologic model was used to find the stream network in a digital elevation model. Where water flows on a mountain defines the bottom of a chimney.

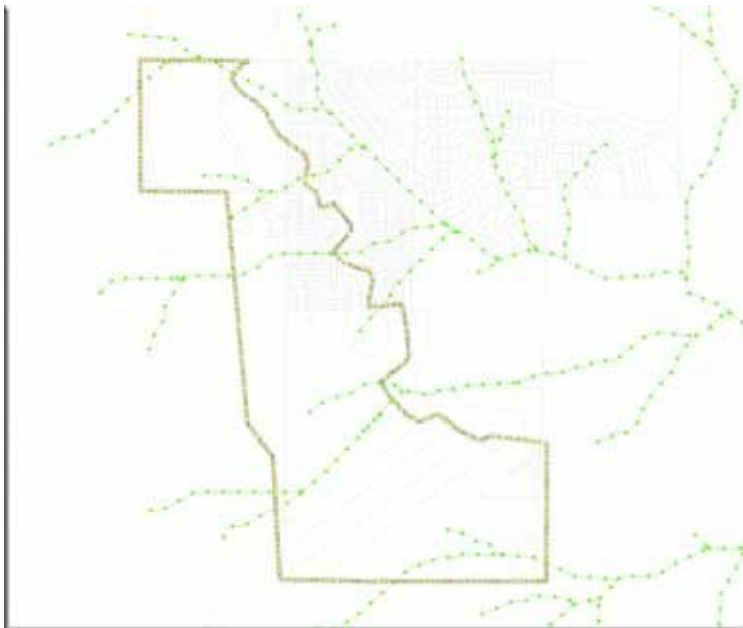


Figure 46: The green dotted lines portray the stream network or the bottom of topographic chimneys. Notice the high number of chimneys found in Structure Protection Group 4 that is outlined in yellow.

The home located at 10124 Sequoia Drive is difficult to locate. It is off Sequoia Road or there is an unmarked access road off Rancheria Road referred to as the lower end of the Shirley Loop. The best access is from Rancheria. Sequoia Road becomes very narrow, overgrown, and rocky! The house is very defensible. It is located within the Alta Fire of 1973 and fuel loading remains relatively low. There is a high amount of brush but little conifer. The home has a water tank, a pump located in what appears to be an outhouse, perimeter sprinklers, and standpipes.



Figure 47: The defensible space below 10124 Sequoia Drive. Notice the sprinkler pipe to the right of center in the photograph. Photo by Timothy Walsh.

The home found at 8301 Old State Road is at the end of a very long paved driveway. The house has a large amount of defensible space and has a stucco exterior.

The home at 7925 Old State Road has a water tank on site for fire protection.

The home located at 10734 Conifer has a shed covered with a wood shingle roof. It will pose a risk for surrounding structures if ignited.

The home located at 10529 Pine (Access off Aspen Way) has a wood shingle roof.

The home located at 8501 Old State Road appears to be falling off its supporting stilts.

Figure 48: 8501 Old State Road appears to be falling off the support timbers. Photo by Timothy Walsh.



The home located at 8817 Old State Road has been under construction for a long period of time. The construction debris is in front of the house.



Figure 49: The home located at 8817 Old State Road with the construction debris left on site. Photo by Timothy Walsh.

There is a major fuel modification from the 1973 Alta Fire found in the southern portion of the group. The area is predominately 30 plus year old brush that will support a high intensity fire during the mid to late summer. Camp Kaweah is located at the northern portion of this group. The camp buildings appeared to be derelict and poses a threat to other structures below them. The water tanks did not appear to have fire department connections and the local fire station captain said they are not a reliable source of water.



Figure 50: An example of some of the buildings at Camp Kaweah. They pose a hazard because they are covered with wood shingles (some have fallen off), doors are open or missing, and there is a heavy needle layer on the forest floor. Photo by Timothy Walsh.

Resource Request

Resource needs are based on the formula of one engine per structure plus one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. Type 1 or 2 engines should not be requested because as the incident changes, there will be tendency to place them on streets where widths and turnarounds are not adequate. As tree mortality continues to spread, more resources may be needed for adequate protection³².

Handcrew orders are based on strategic needs. Crews should pre-treat the structures removing all dead trees found within the group. Crews should thin and pre-treat the large parcels at the following locations:

Below 8301 Old State Road. The parcel spans between Sequoia Road and Old State Road.

Below 10124 Sequoia Drive. The parcel spans between Sequoia Road and Old State Road.

The County Park west of Willow Drive in the northwestern portion of the group.

Sequoia Road should be widened with brush removed from each side.

The Forest Service land that borders the east and west side of the group.

The large vacant parcel between 8431 and 8301 Old State Road.

Four vacant parcels between 10510 and 10532 Sequoia Drive.

Four vacant parcels between 10621 and 10731 Conifer Lane.

The area west of the Structure Protection Group has been thinned and ladder fuels removed. If piles still exist, they must be treated with foam or pretreatment gel.

Another consideration should be the installation of a hard pipe sprinkler system. A commercial company could bring in pipe, sprinklers, and pumps to set up a system paralleling the homes on Sequoia Drive and the west side of Conifer Lane. This system would need 2,000 feet of pipe to stretch from Willow Road north paralleling Cedar Drive. Water may be able to be drafted from the tanks located at the end of Pine Drive. If not, portable tanks up to 50,000 gallons are currently available for purchase³³. The sprinkler system could be started from the water tank and abandoned if fire conditions become intolerable.

³² In the event of a crown fire, **no amount** of resources will protect the community!

³³ More information on pillow tanks can be found at:
http://www.interstateproducts.com/pillow_tanks.htm

Table 39: Resources needed for Structure Protection Group 4.

Street Structures	Engines	Handcrews	Water Tenders ³⁴
Ice House Road	7	4	1
Conifer Lane ³⁵ 16	9 1 2		
Pine Dr./Aspen Way/Sequoia Rd ³⁶	20 12 1 2		
Holly	8 6 0 1		
Old State Road ³⁷ 20	14 1 3		
Camp Kaweah	6	3	1
Group Total	77 48 4 10		

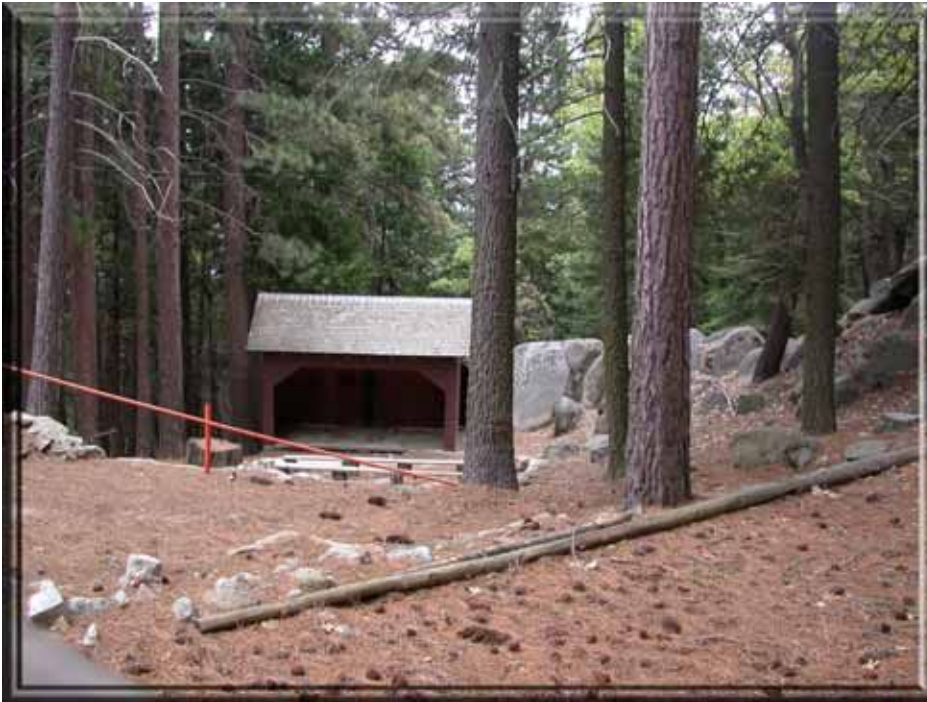


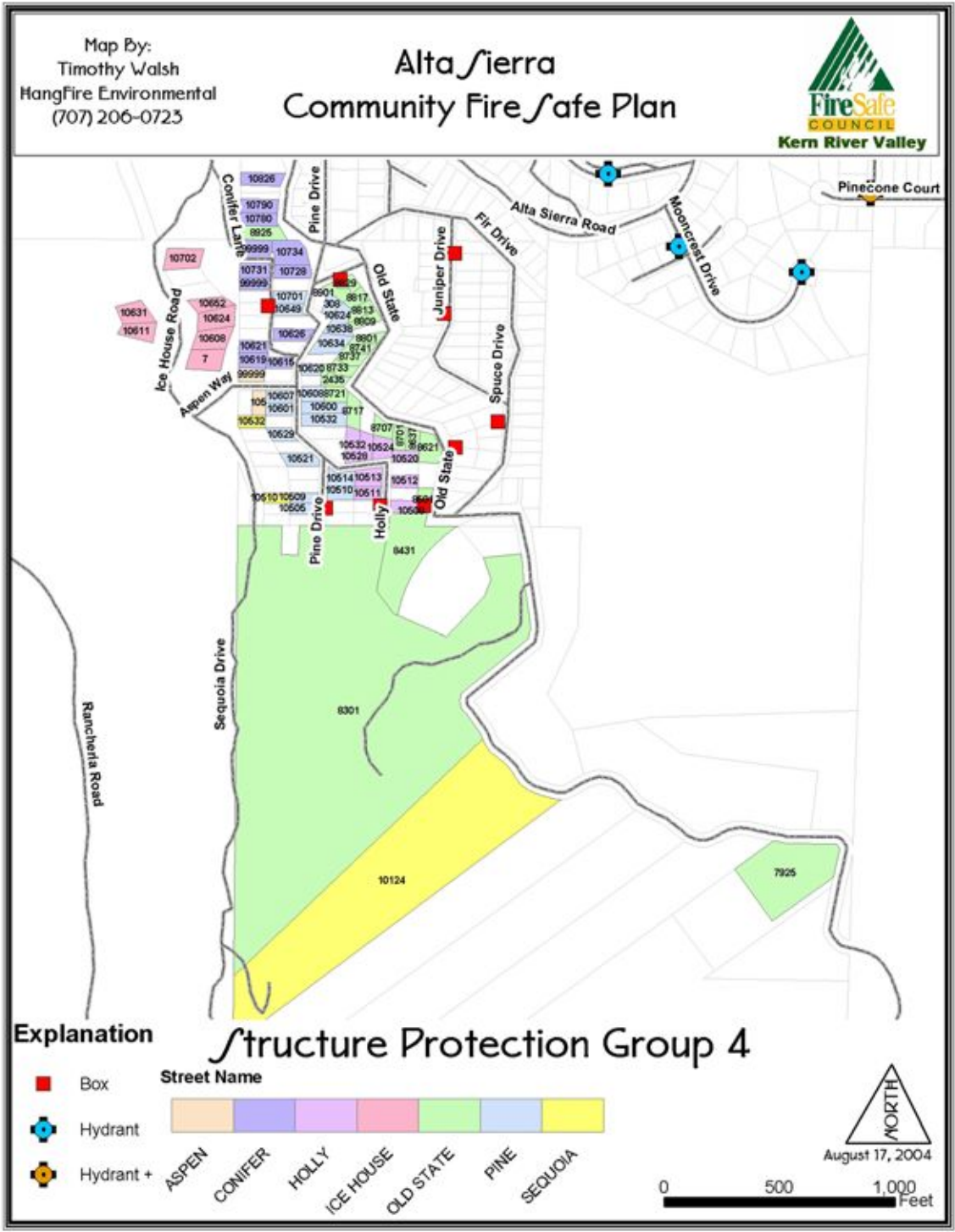
Figure 51: Another example of a shed at Camp Kaweah. With the open construction method, this structure is susceptible to ignition from burning embers from either the wood roof or an interior ignition.

³⁴ Type 2 Water tenders are recommended / (1000 gallon capacity with short wheelbase)

³⁵ This will include cabins found with an Old State Road and Pine Drive addresses due to proximity.

³⁶ The two homes located on lower Sequoia Road.

³⁷ Including 10124 Sequoia Road.



Map 32: Structure Protection Group 4-All addresses displayed as 99999 are not known or posted.

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 4 Aerial Photograph

Explanation

 Structure Protection Group 4

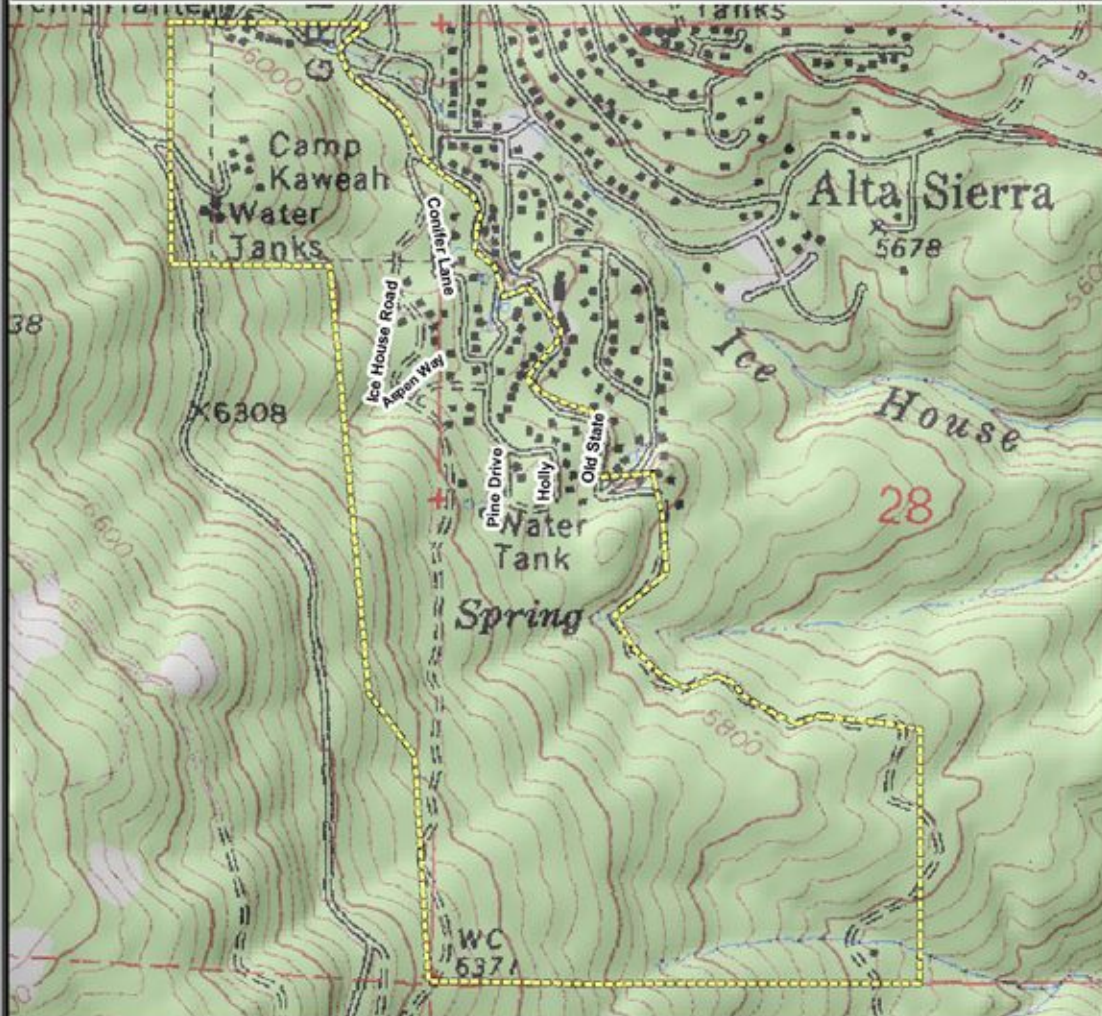
0 1,000 2,000 Feet



Map 33: Structure Protection Group 4 Aerial Photograph-Notice the large fuel modification from the 1973 Alta Fire located in the southern portion of the group.

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 4 USGS Topographic Map

Explanation

 Structure Protection Group 4

0 1,000 2,000 Feet



Map 34: Structure Protection Group 4 USGS Topographic Map.

Structure Protection Group 5

General Area:

Structure Protection Group 5 consists of the southwest corner of the study area.

Number of Homes

45 Cabins or Primary Dwellings.

Number of Vacant Lots

47 Non-Government Owned Lots. A large (50-acre) private parcel to the southwest and several small private parcels east of Bonita Way border the Structure Protection Group. The Forest Service owns the land south of Pinecone Court and east of Jay Way.

Streets

Alta Sierra Road
Broken Toe Lane³⁸
Jay Way
Pinecone Court
Mooncrest Drive
Crescent Drive
Bonita Way

Aspect

As seen by Chart 25, the majority of the slopes are facing the southeast through southwest. These slopes receive the most solar radiation throughout the day. They will support a high concentration of brush and the fuel moistures will be dryer than other aspects. The southern aspects will also burn longer into the night due to the lower fuel moistures.

Slope

As seen in Chart 26, the slopes within the group are moderately steep. The steepest slopes are found south of Pinecone Court, east of Jay Way and south of Mooncrest Drive.

³⁸ Although this dirt road is not on a map, it is labeled as Broken Toe Lane on the western assess point near Elm Drive. This is the only access to four homes that parallel Alta Sierra Road.

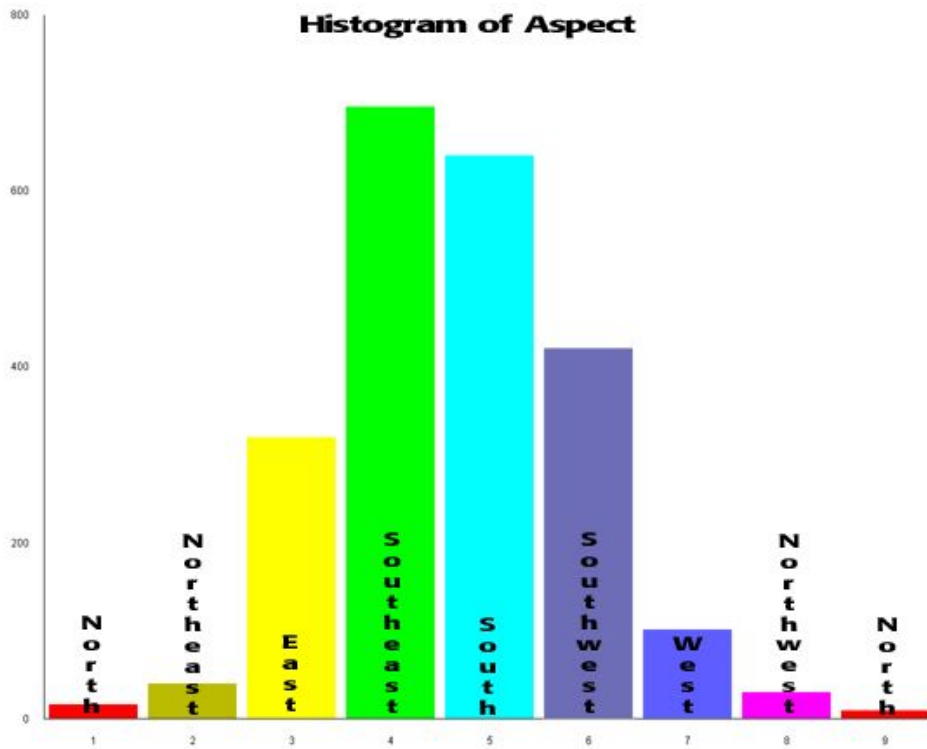


Chart 25: Histogram of Aspect for Structure Protection Group 5

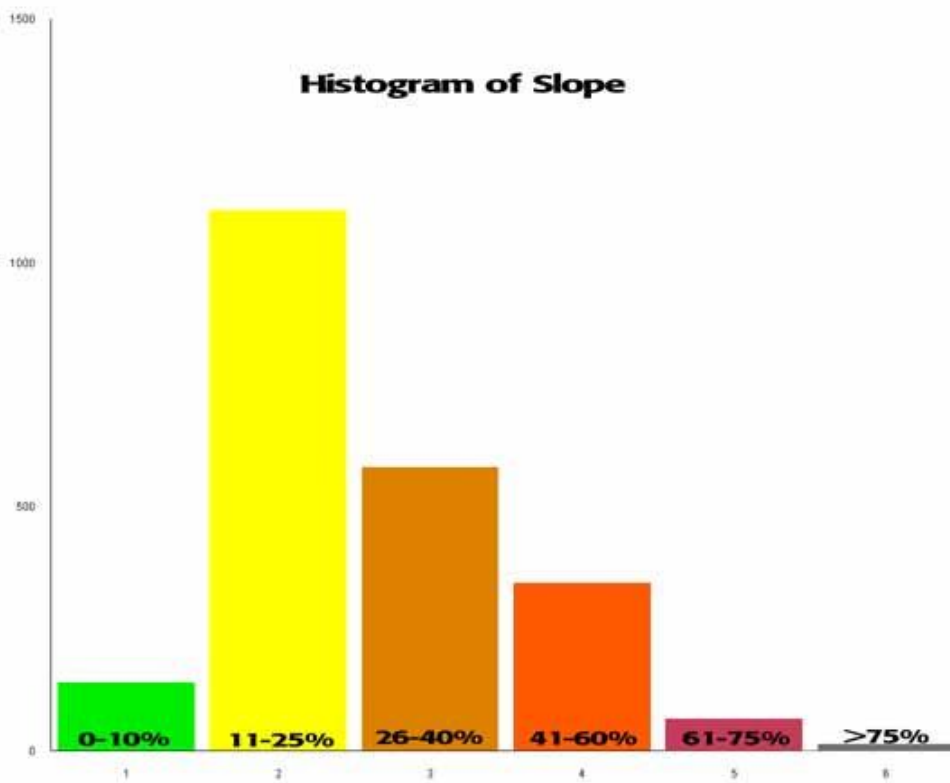


Chart 26: Histogram of Slope for Structure Protection Group 5

Hydrant Information

This group supports the greatest water supply in the community. There are three of the newer hydrants reported to produce 750 gallons per minute.

Control Issues:

The greatest control issue for this structure protection group is the high number of vacant parcels. Some of the parcels have been thinned but a majority of them are overgrown with small trees.



Figure 52: An example of the overstocked forest looking east from the cul-de-sac on Pinecone Court east of Jay Way. Photograph by Timothy Walsh.

A few of the parcels have been thinned with the ladder fuels removed. They should be used as a model for other lots in this group.



Figure 53: This lot located next to 1401 Pinecone Court has been thinned and the ladder fuels have been removed. Photograph by Timothy Walsh.

Another control issue is the lots that have been thinned but the slash has been left on site. The forest debris will fuel high intensity fires that will have long burn out times and can cause serious mop-up issues.



Figure 54: An example of where trees have been felled but the slash has been left on site. Photograph by Timothy Walsh.

Houses with 1512, 1518, 1524 and 1608 Alta Sierra Road addresses are located on Broken Toe Lane. The dirt road runs west from the intersection of Bonita Way to almost to Elm Drive paralleling Alta Sierra Road. There is a chimney with high concentrations of brush located between 1524 and 1606 Alta Sierra Road.

Any fire established in Ice House Creek will make an upslope run toward the homes located on Pinecone Court, Mooncrest Drive, and Crescent Drive.

The lot located northeast of 1512 Mooncrest is highly hazardous due to the large amounts of discarded building materials including old trusses and other wood. There is also a LPG tank and other debris that needs to be addressed.

Although not a hazard, it can be quite difficult to figure out the addresses in the group because 1700 Alta Sierra shares a border with 1700 Crescent which is across the street from 1700 Mooncrest.

1500 Pinecone Court is accessed from a very long dirt driveway. It is behind 1502 Pinecone and could be easily missed. The map makes it look easier to access the property from Mooncrest Drive but this is not the case.

1606 and 1600 Crescent also have a moderately long dirt access road that parallels Crescent.

The parcel north of 10811 Bonita Way and south of Alta Sierra Road needs to be thinned to insure access into Broken Toe Lane during a fire.

Resource Request

Resource needs are based on the formula of one engine per structure plus one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. Type 1 or 2 engines should not be requested because as the incident changes, there will be tendency to place them on streets where widths and turnarounds are not adequate. If Type 1 or 2 engines respond to a fire in Alta Sierra, this is the only group where they can be safely assigned. As tree mortality continues to spread, more resources may be needed for adequate protection³⁹.

Handcrew orders are based on strategic needs. Crews should pre-treat the parcels removing all dead trees found within the group. Crews should thin and pre-treat the large parcels at the following locations:

Between 1401 and 1455 Pinecone Court.

East of 1313 and 1312 Pinecone Court.

The large privately owned parcel below Crescent and Mooncrest Drives.

The area south of the Structure Protection Group has been identified for future thinning and ladder fuels removal. If piles still exist, they must be treated with foam or pretreatment gel.

Another consideration should be the installation of a hard pipe sprinkler system. A commercial company could bring in pipe, sprinklers, and pumps to set up a system paralleling the homes below Pinecone Court, Mooncrest Drive, and Crescent Drive. This system would need 5,000 feet of pipe to stretch from Alta Sierra Road wrapping below the group tying back into Alta Sierra Road near Elm Drive. Water could supply the system from the 200,000 gallons stored in tanks and tapped from the hydrants located near Jay Way and Pinecone Court. If not, portable tanks up to 50,000 gallons are currently available for purchase⁴⁰. The sprinkler system could be started from the water tank and abandoned if fire conditions become intolerable.

³⁹ In the event of a crown fire, **no amount** of resources will protect the community!

⁴⁰ More information on pillow tanks can be found at:
http://www.interstateproducts.com/pillow_tanks.htm

Table 40: Resources needed for Structure Protection Group 5.

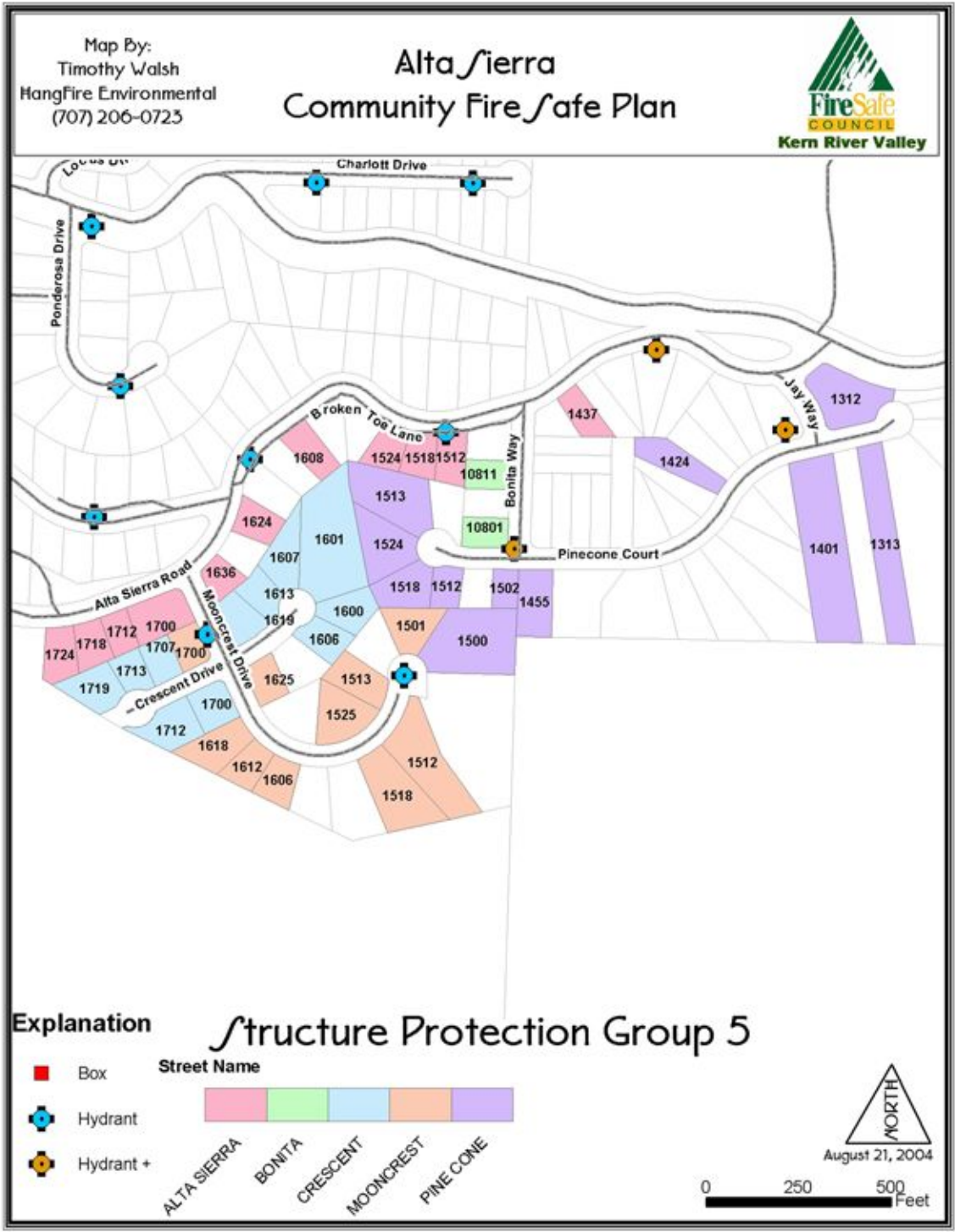
Street Structures		Engines	Handcrews	Water Tenders⁴¹
Alta Sierra	7	5	1	1
Broken Toe Lane	4	3	0	1
Pinecone Court/Bonita Way	13 10 1	2		
Crescent Drive ⁴²	13 8 0	2		
Mooncrest Drive	8	5	1	1
Group Total	45 31 3	7		



Figure 55: Mortality has started to be prevalent within this group. Crews should fall these trees prior to a fire. Photo by Timothy Walsh.

⁴¹ Type 2 Water tenders are recommended / (1000 gal with short wheelbase)

⁴² This number includes two homes on Mooncrest Drive.



Map 35: Structure Protection Group 5-All addresses displayed as 9999 are not known or posted.

Map By:
Timothy Walsh
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(707) 206-0723

Alta Sierra Community Fire Safe Plan



Structure Protection Group 5 Aerial Photo

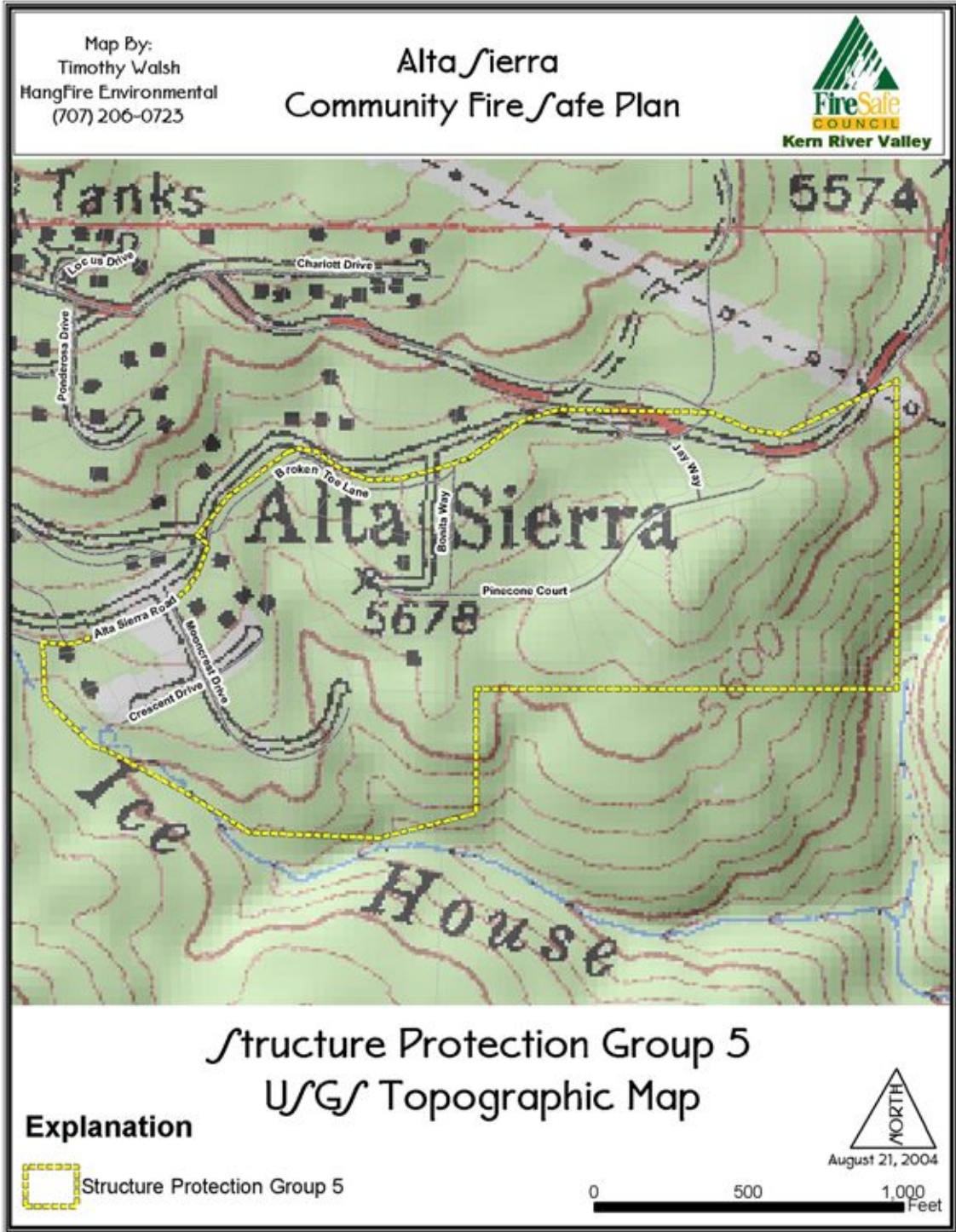
Explanation

 Structure Protection Group 5



0 500 1,000
Feet

Map 36: Structure Protection Group 5 Aerial Photograph



Map 37: Structure Protection Group 5 USGS Topographic Map.

Structure Protection Group 6

General Area:

Structure Protection Group 6 consists of the Greenhorn Summit area including the Summit Tract, Weeping Springs, and Slick Rock Track of the USFS Cabins.

Number of Homes

29 Cabins or Primary Dwellings and the USFS Summit Fire Station.

Number of Vacant Lots

All of the structures within this group are surround by large parcels of USFS land.

Streets

Slick Rock Roads 1-6
Weeping Springs
Summit Road 1 and 2

Aspect

As seen by Chart 27, the majority of the slopes are facing the northwest and west. The western slopes receive a high amount of solar radiation throughout the day. These aspects will support a high concentration of brush and the fuel moistures will be low. The northern aspects will become shaded earlier and support higher fuel moistures and generally higher fuel loads.

Slope

As seen in Chart 28, the slopes within the group are very steep. Fortunately, the majority of the cabins are located at the base of the slopes. Unfortunately, the Slick Rock Cabins are located in a topographic chimney where wind and embers will be funneled during a wildland fire coming from the west. The Summit Cabins are located in a saddle in the Greenhorn Summit. The Weeping Spring Cabins are located mid-slope at the confluence of two drainages.

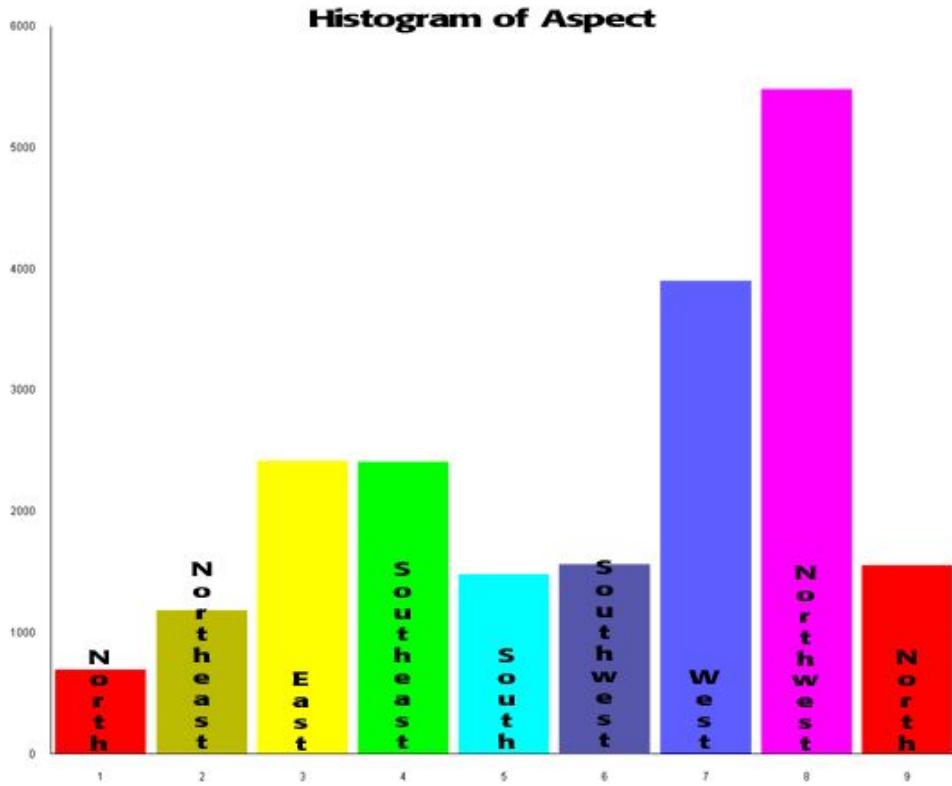


Chart 27: Histogram of Aspect within Structure Protection Group 6

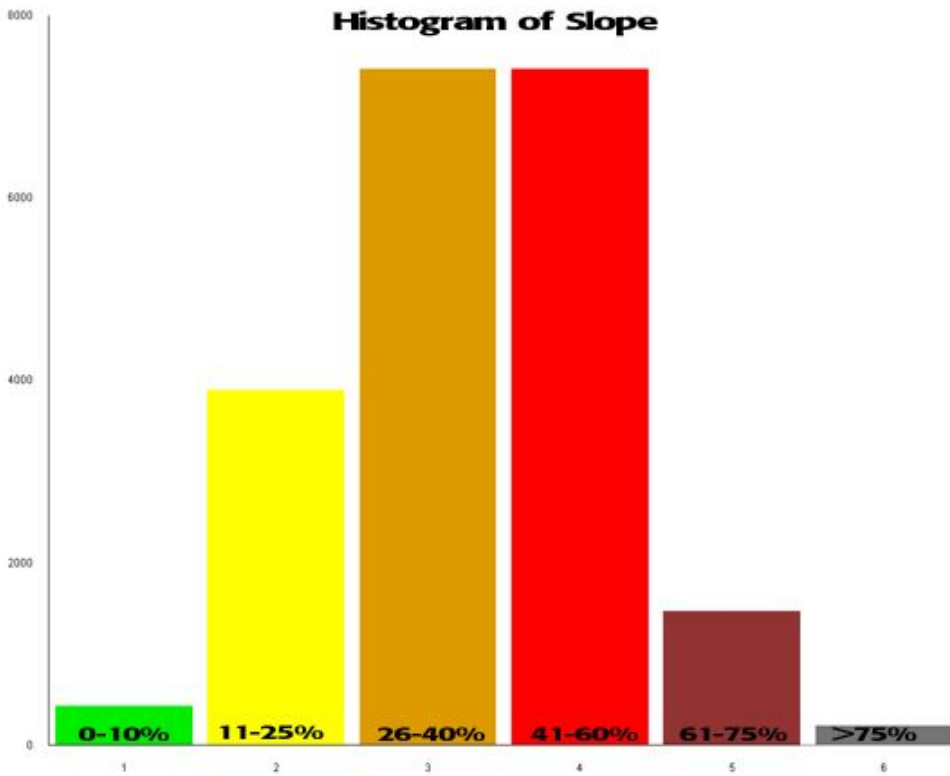


Chart 28: Histogram of Slope within Structure Protection Group 6

Hydrant Information

There are **no hydrants** within this structure protection group!

Control Issues:

This structure protection group is isolated from the rest of the community. There is no water sources within this group. The drive up Highway 155 is very steep resulting in long turn around times for water.

Most of the cabins have very long access roads that should be scouted prior to committing an engine. Depending on the number of privately owned vehicles in this area, turn around areas may or may not be available.

If fire is established anywhere within the Slick Rock Creek drainage, Highway 155 should be closed for fire fighter safety.

Summit Cabins 4, 5, and 10 have wood shingle roofs that could compromise other structures in the area.

Slick Rock Cabins 14 and 15 have wood shingle roofs that could compromise other structures in the area.

The powerline fuelbreak intersects this group running east to west. This fuel break needs brushing but could be used as an anchor point for suppression strategies.

During the morning and late afternoon when the wind direction changes, this structure protection group could be subject to very radical and turbulent wind/fire conditions including multiple spot fires, rapid upslope fire runs, and fire whirl development. The problem with erratic wind stem from the location of this group situated at the summit compounded by a predominate saddle and numerous chimneys/drainages.



Figure 56: Cabin 14 is situated like most of the Slick Rock Cabins. It is located in the bottom of the drainage with a steep slope directly behind the cabin.

Resource Request

Resource needs are based on the formula of one engine per structure plus one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. Type 1 or 2 engines should not be requested because as the incident changes, there will be tendency to place them on streets where widths and turnarounds are not adequate. As tree mortality continues to spread, more resources may be needed for adequate protection⁴³.

Handcrew orders are based on strategic needs. Crews should pre-treat the parcels removing all dead trees found within the group. Crews should thin and pre-treat the large parcels at the following locations:

- Behind the Slick Rock Cabins
- Behind the Weeping Spring Cabins
- Behind the Summit Cabins
- Behind the Summit Forest Service Station

Another consideration should be the installation of a hard pipe sprinkler system. A commercial company could bring in pipe, sprinklers, and pumps to set up a system behind the cabins in the Slick Rock and Summit Tracts. This system would need 3,000 feet of pipe for the Slick Rock Tract. Another 2,500 feet of pipe would be needed to plumb the Summit Cabins. Water could be shuttled or relay pumped from Cedar Creek, which is located approximately one and one half miles below the Slick Rock Cabins. If not, portable tanks up to 50,000 gallons are currently available for purchase⁴⁴. The tanks located at the Summit Forest Service Station are in poor condition with slow refill rates. The sprinkler system could be started from the water tank and abandoned if fire conditions become intolerable.

Table 41: Resources needed for Structure Protection Group 6.

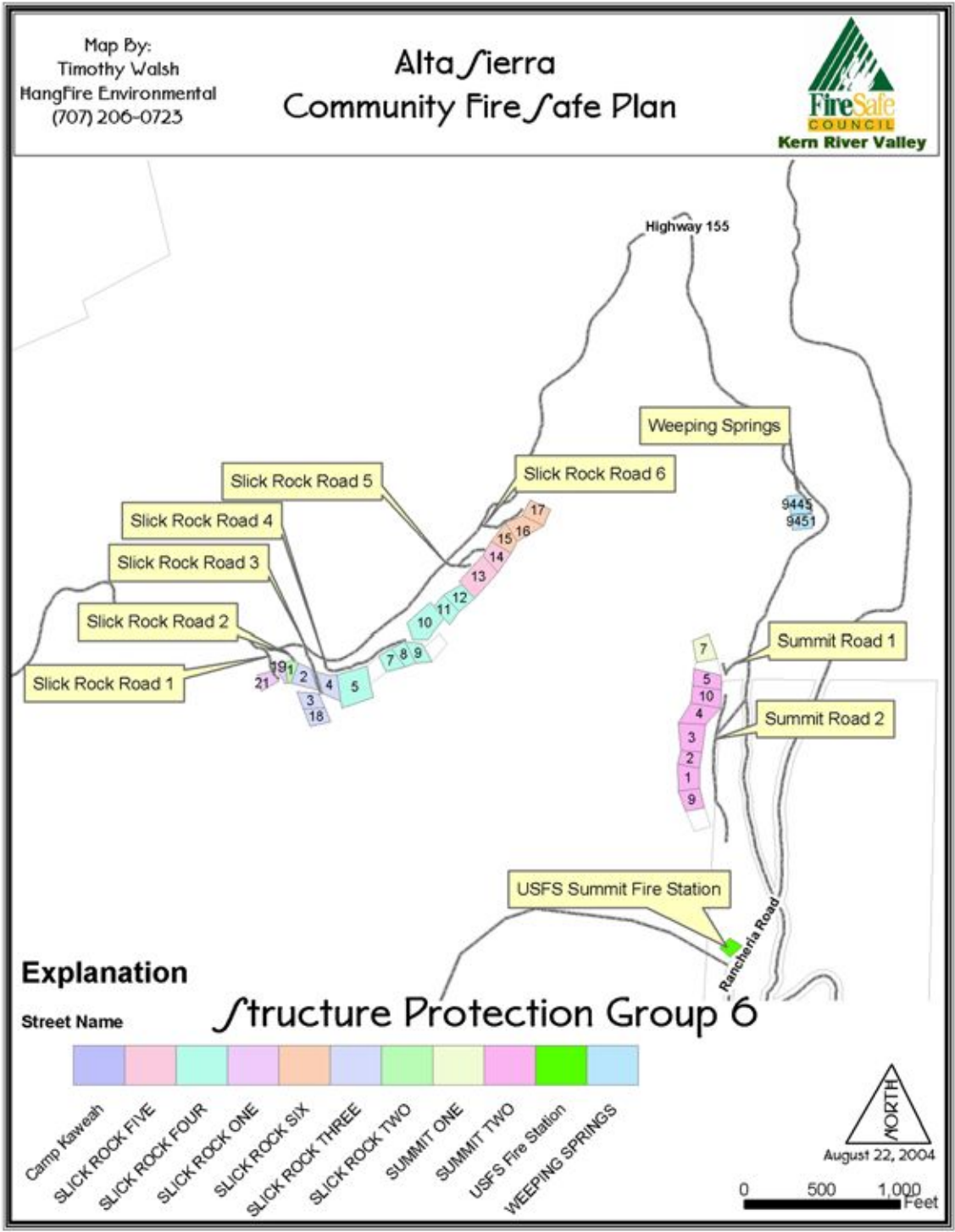
Street Structures	Engines	Handcrews	Water Tenders ⁴⁵
Slick Rock Roads 1-6	19	12	1
Summit 8		5	1 1
Weeping Springs	2	1	0
Forest Service Station	4	1	0
Group Total	33	19	2

⁴³ In the event of a crown fire, **no amount** of resources will protect the community!

⁴⁴ More information on pillow tanks can be found at:

http://www.interstateproducts.com/pillow_tanks.htm

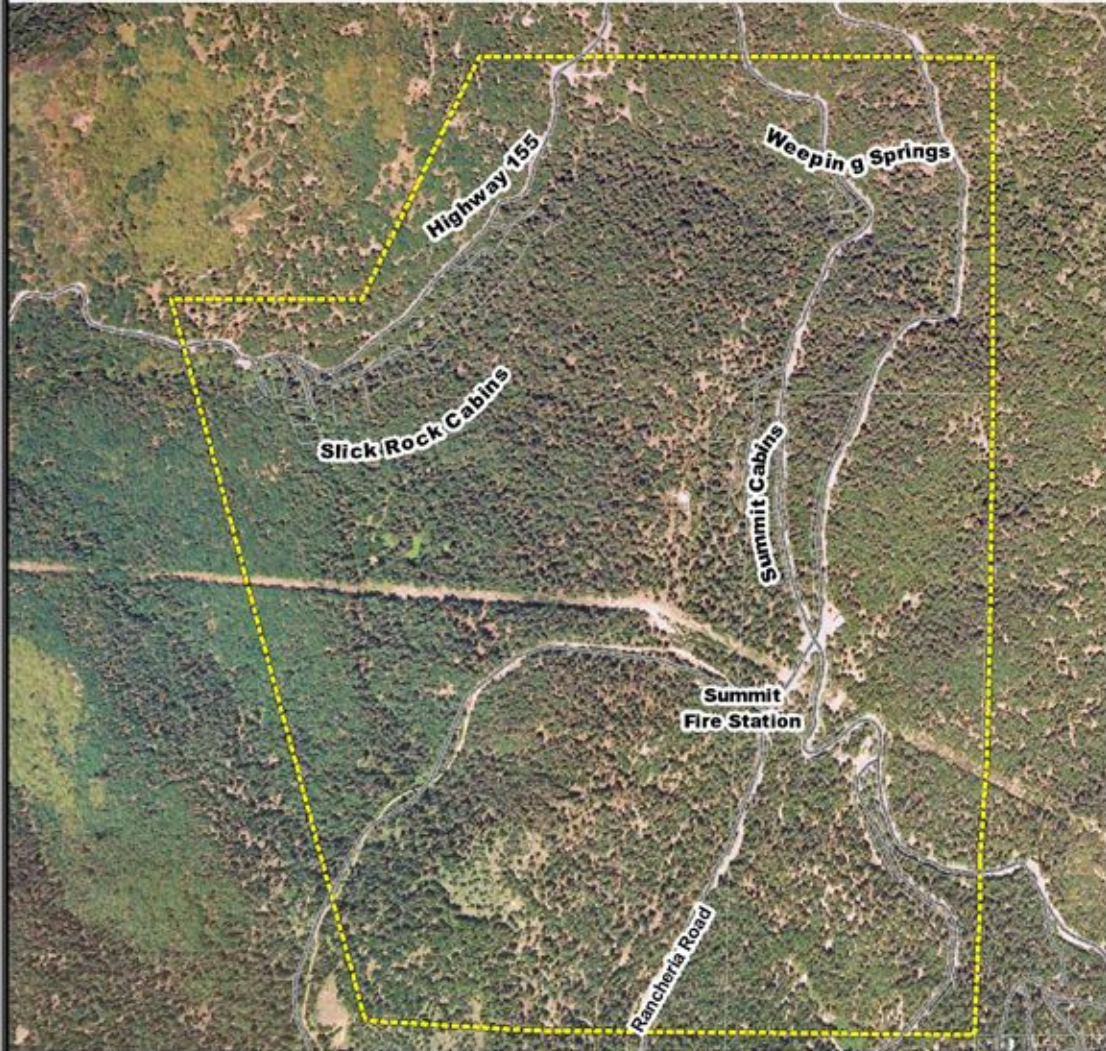
⁴⁵ Type 2 Water tenders are recommended / (1000 gal with short wheelbase)



Map 38: Structure Protection Group 6-All addresses displayed as 99999 are not known or posted.

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 6 Aerial Photograph

Explanation

 Structure Protection Group 6

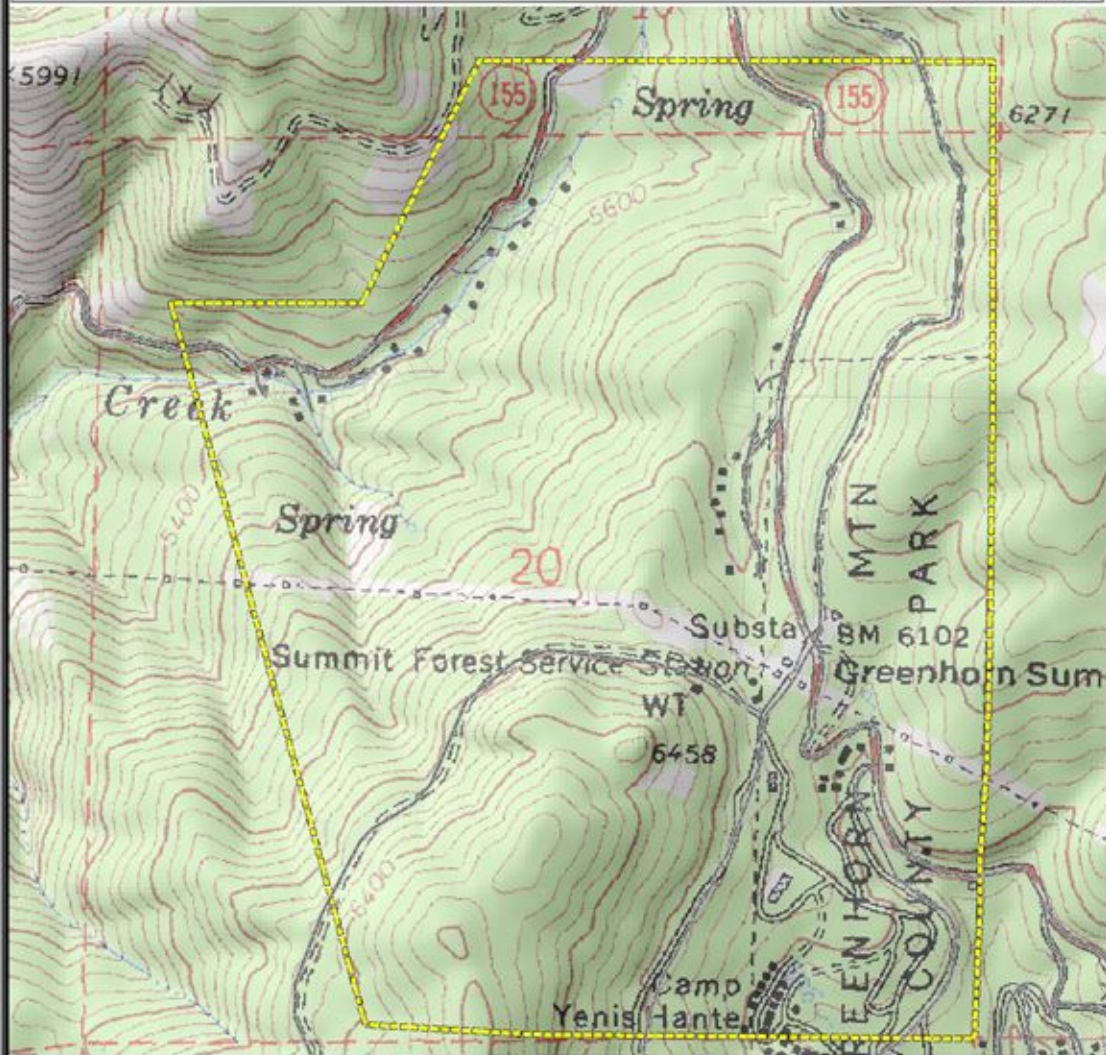


0 550 1,100 Feet

Map 39: Structure Protection Group 6 Aerial Photograph.

Map By:
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 6

Explanation

USGS Topographic Map



Structure Protection Group 6



August 22, 2004

0 500 1,000 Feet

Map 40: Structure Protection Group 6 USGS Topographic Map.

Structure Protection Group 7

General Area:

Structure Protection Group 7 consists of the Shirley and Elmonte Tracks of the USFS Cabins. The Shirely Meadows Ski Area is also within this group.

Number of Homes

23 Cabins or Primary Dwellings, 4 commercial buildings at the Ski Area, 1 mobile home across the parking lot from the ski area, and the maintenance building behind the mobile home.

Number of Vacant Lots

All of the structures within this group are surrounded by large parcels of USFS land.

Streets

Rancheria Road
Shirley Loop Road

Aspect

As seen by Chart 29, the majority of the slopes are facing the east. These aspects will reach peak solar heating in the early morning hours.

Slope

As seen in Chart 30, a majority of the slopes are between 26-40 percent. The Shirley Cabins are located precariously mid-slope and caution should be exercised while providing structure protection. The cabins are also situated in the confluence of three drainages that could funnel wind and embers during a wildland fire.

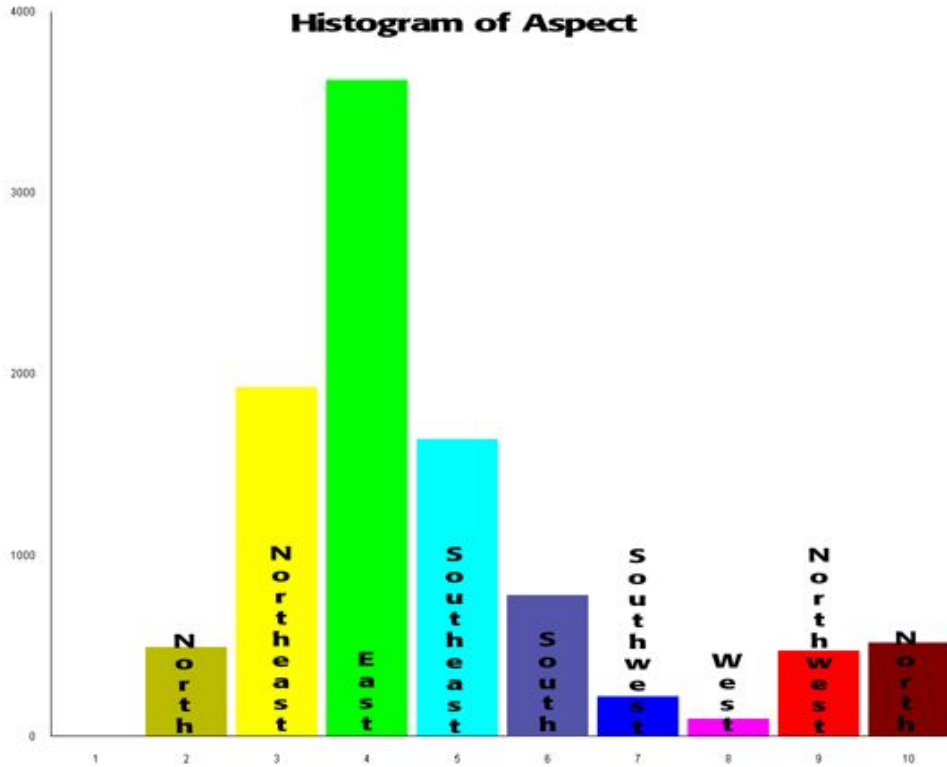


Chart 29: Histogram of Aspect within Structure Protection Group 7

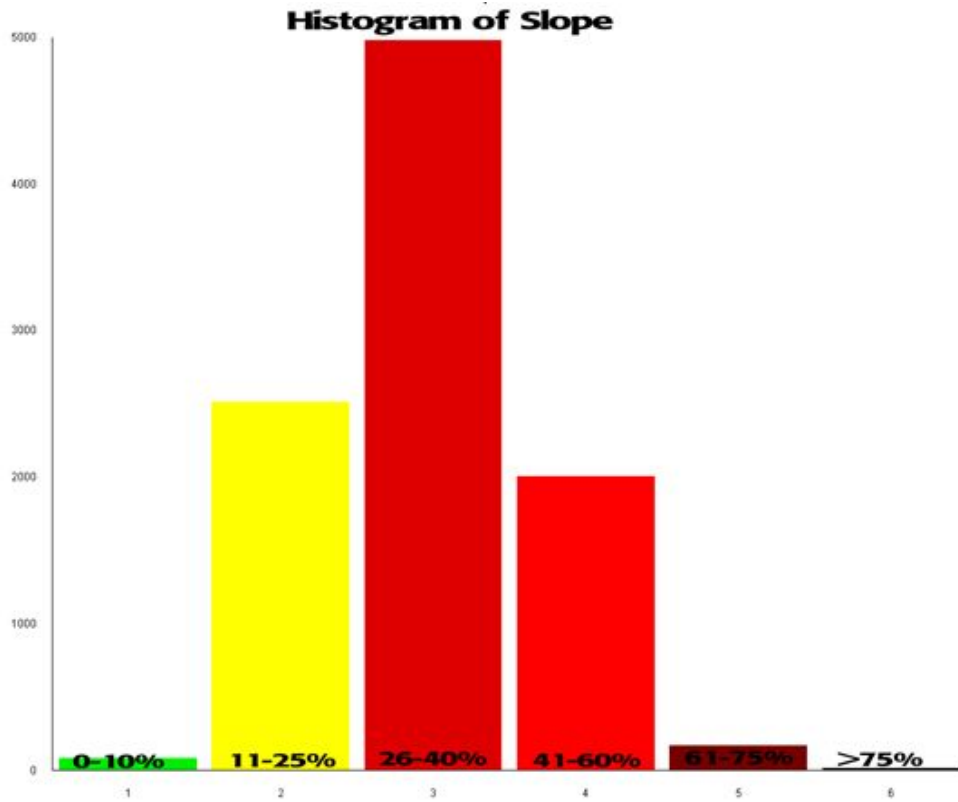


Chart 30: Histogram of Slope within Structure Protection Group 7

Hydrant Information

There are **no hydrants** within this structure protection group!

Control Issues:

The two greatest control issues for this group are very bad access and lack of hydrants.

The Shirley Meadow Road is also marked as Forest Road 25S31.

The Shirley Meadow Road is a large loop with lower access from Rancheria Road adjacent to the El Monte Cabin 6 and the upper access just below the ski area. There is very heavy brush on the upper parts of the road below the ski area. The road is very narrow with very sharp turns!

The traffic pattern should be controlled on the Shirley Meadow loop. One-way traffic should access the lower portion of the loop to prevent engines or crews from being trapped.

Most of the cabins have adequate clearance of brush but there is a deep continuous layer of duff and litter.



Figure 57: This is a typical cabin found in the Shirley Meadows Tract. Wood construction with a comp roof is the normal construction type. The area has very large trees with a large amount of duff and needle litter.

When entering the Shirley Meadows Tract, engines will be committed up a 1400 foot road prior to the first cabin. It is over ½ mile past the last cabin where the road makes a sharp turn to the north. From there, it is approximately another 2,400 feet until pavement.

The access to Cabin 4 in the El Monte Tract is a very long driveway.

The ski area has four commercial buildings on site with very good clearance.



Figure 58: The commercial buildings that make up the Shirley Meadows Ski Area with excellent defensible space. Behind the building is pavement that is used as a parking lot during the ski season.

The ski area would make an excellent shelter deployment area. There are not adequate interior facilities to shelter numerous citizens in the small commercial buildings as seen in the photo above.



Figure 59: This photo mosaic indicates the size of Shirley Meadows. The green grass on ski slopes in late May will cure and carry fire in the fall.

A caretaker is normally at the mobile home located on the west side of the parking lot. The mobile home is 1600 Rancheria Road but is not posted. The radio site at the top of the Shirley Peak is another asset that should be protected if fire conditions permit. The Shirley Peak radio site, just north of the radio tower is the main communication site for Kern County Communications, State of California, Army Corp of Engineer, Southern California Edison, United Forest Service and Kern Valley Ham Radio Users.

There is approximately 600-800 feet of clearance from the center of the ski area with small groves of trees used to delineate ski lanes.

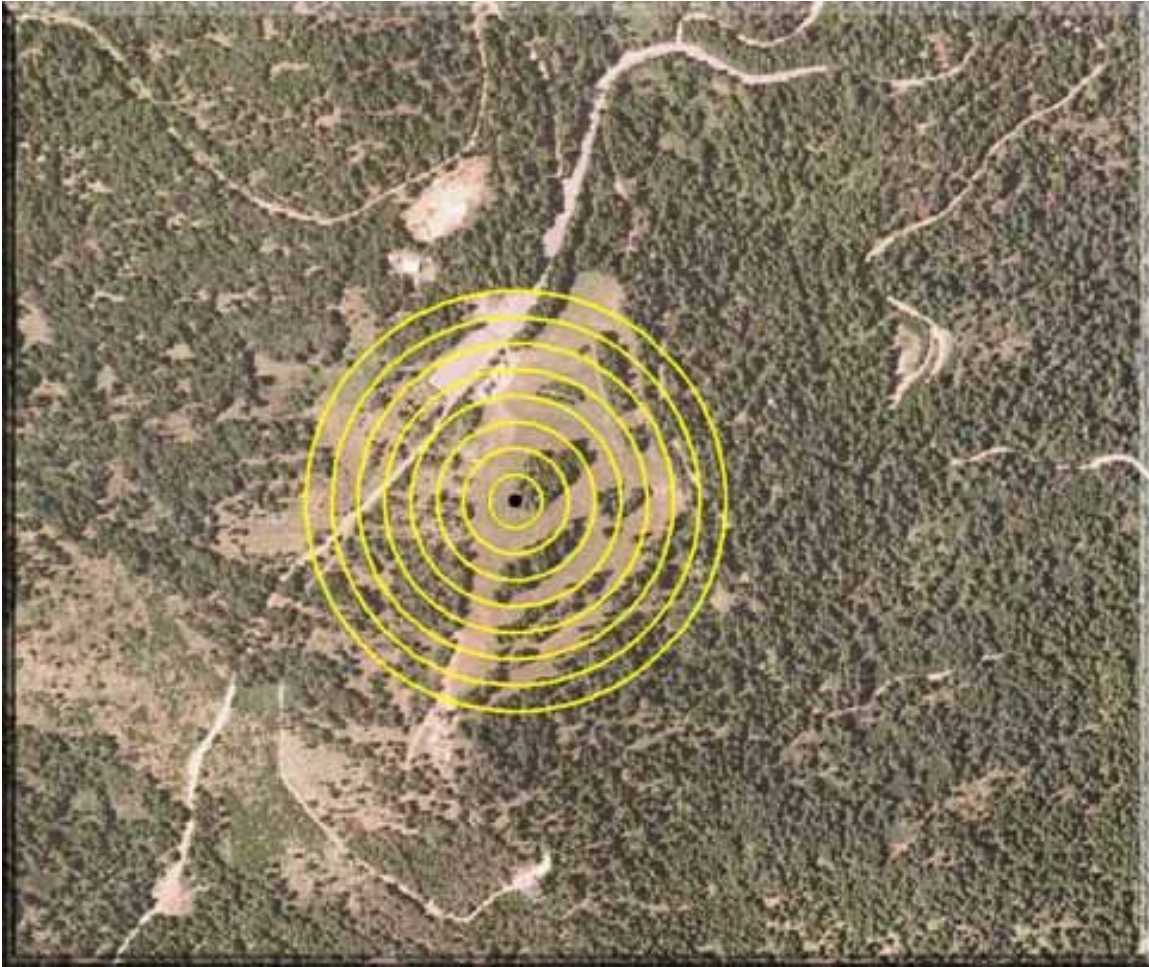


Figure 60: This aerial photograph of the ski area was buffered using 100-foot rings starting from the black dot in the center of the photo. There is very heavy fuel to the east or left of the outer ring that coincides with the location of the Shirley Meadow Cabins.

Resource Request

Resource needs are based on the formula of one engine per structure plus one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures. Type 1 or 2 engines should not be requested because as the incident changes, there will be tendency to place them on streets where widths and turnarounds are not adequate. As tree mortality continues to spread, more resources may be needed for adequate protection⁴⁶.

⁴⁶ In the event of a crown fire, **no amount** of resources will protect the community!

Handcrew orders are based on strategic needs. Crews should pre-treat the parcels removing all dead trees found within the group. Crews should thin and pre-treat the large parcels at the following locations:

- Behind the El Monte Cabins.
- Behind the Shirley Meadow Cabins.
- Behind the ski area buildings on both sides of Rancheria Road.

Another consideration should be the installation of a hard pipe sprinkler system. A commercial company could bring in pipe, sprinklers, and pumps to set up a system behind the cabins in the El Monte and Shirley Meadow Tracts. This system would need 3,000 feet of pipe for the Shirley Meadow Tract. Another 1,000 feet of pipe would be needed to plumb the El Monte Cabins. Water tenders would need to shuttle water or portable tanks up to 50,000 gallons are currently available for purchase⁴⁷. The sprinkler system could be started from the water tank and abandoned if fire conditions become intolerable.

Table 42: Resources needed for Structure Protection Group 7.

Street Structures	Engines	Handcrews	Water Tenders ⁴⁸
El Monte Tract	3	0	1
Shirley Meadows	20	14	5 ⁴⁹
Ski Area	6	2	1
Group Total	29	19	7

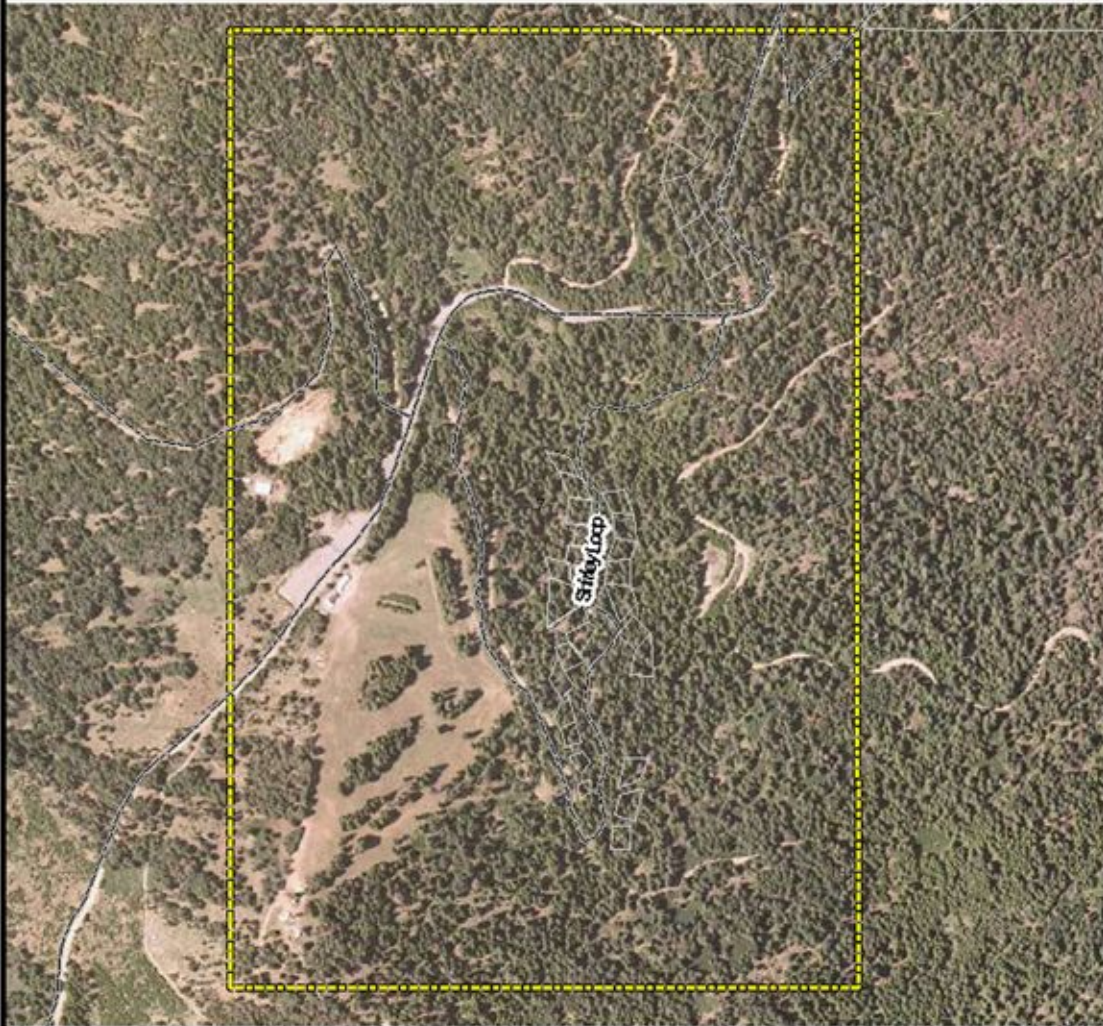
⁴⁷ More information on pillow tanks can be found at:
http://www.interstateproducts.com/pillow_tanks.htm

⁴⁸ Type 2 Water tenders are recommended / (1000 gal with short wheelbase)

⁴⁹ Due to the lack of water sources and turn around times

Map By:
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Alta Sierra Community Fire Safe Plan

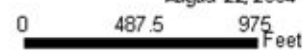


Structure Protection Group 7 Aerial Photograph

Explanation



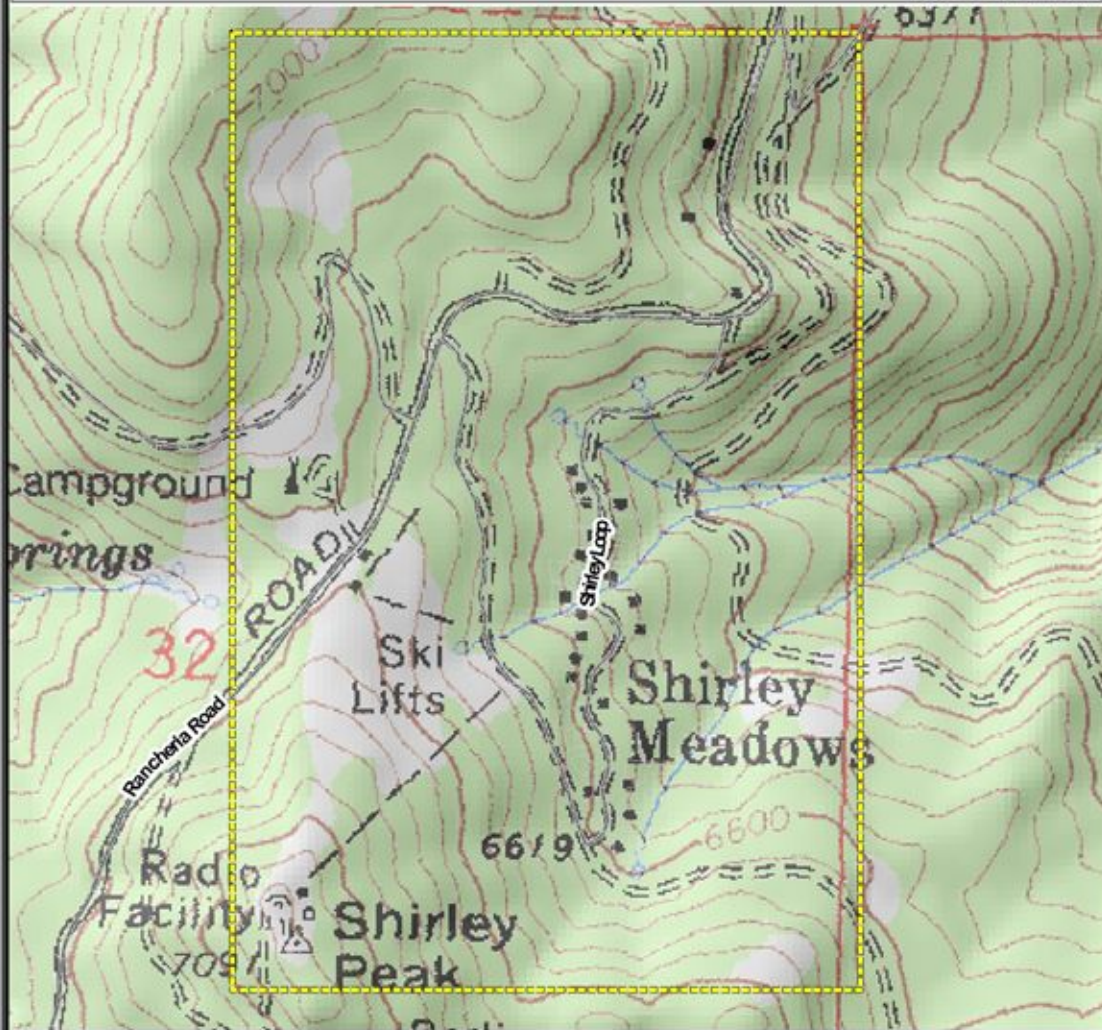
August 22, 2004



Map 42: Structure Protection Group 7 Aerial Photograph

Map By:
Timothy Walsh
HangFire Environmental
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Alta Sierra Community Fire Safe Plan



Structure Protection Group 7 USGS Topographic Map

Explanation



Map 43: Structure Protection Group 7 USGS Topographic Map

Total Resource Request

Table 43: Total Resource Request for Structure Protection

Group	Structures	Engines	Handcrews	Water Tenders
1	60	40	3	4
2	81	59	4	12
3	74	50	4	12
4	77	48	4	10
5	45	31	3	7
6	33	19	2	6
7	29	19	2	7
Total	399	266	22	61

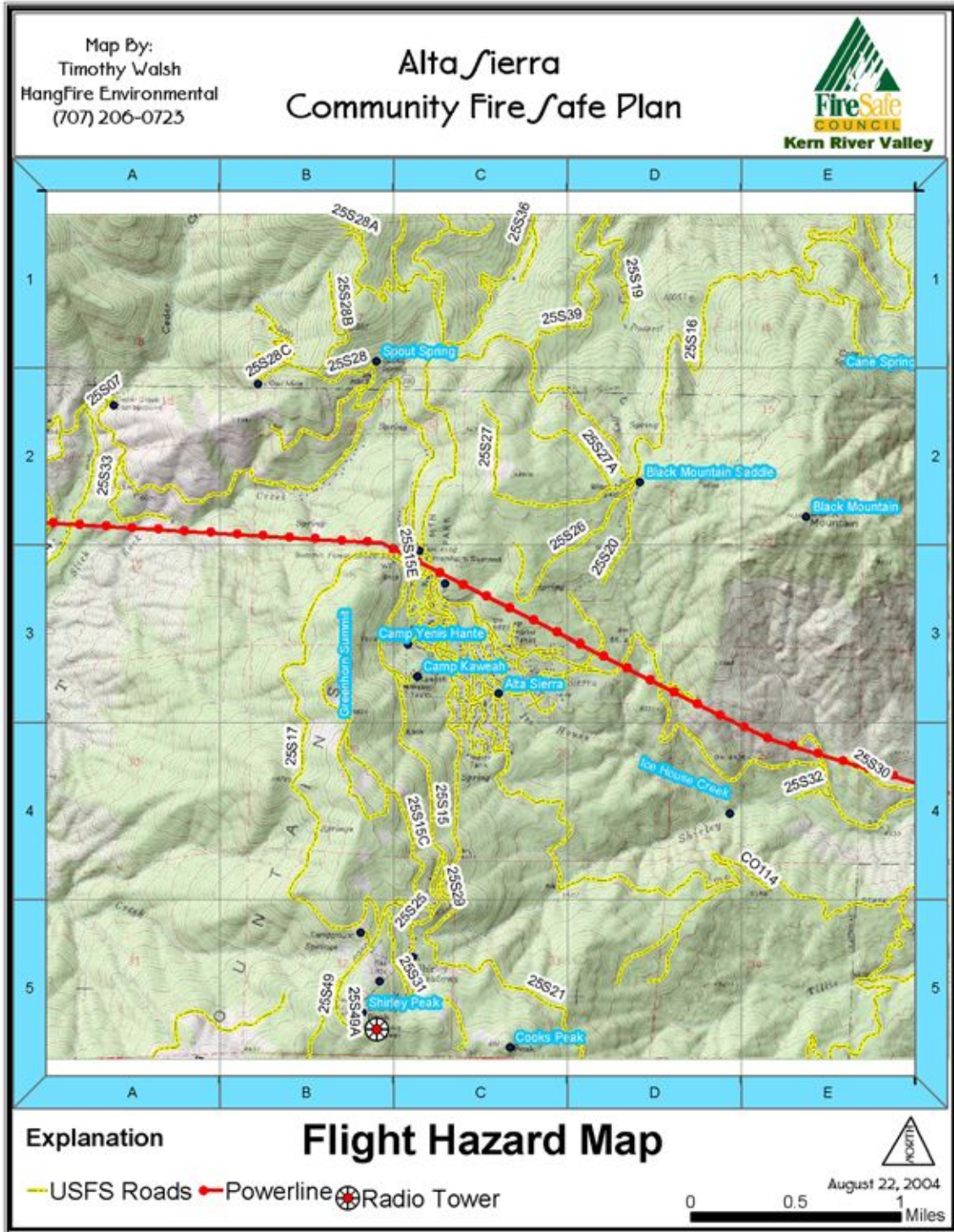
This resource request is impossible to fill in a timely manner! The construction methods, position on the slope, fuel loading, and lack of reliable water sources make these resources a necessity to adequately protect the community. Unfortunately, the isolation of Alta Sierra will make travel times excessive. This resource order is a tool to assist the incident commander realize the challenges of protecting this community.

It should also be realized that only some of the structure groups may need protection depending on fire spread direction and intensity. For example, if the fire is threatening the community from the west side of the Greenhorn Mountains, then possibly ordering resources for Structure Protection Groups 4, 6, and 7 will be necessary. The situation will dictate resource needs. The most important point is to place a resource order early due to the excessive travel times.

Rotary wing aircraft will be invaluable for fire suppression and quick suppression of spot fires. Dip sites are far and few outside of Lake Isabella, which is a long turn around time. If the community is threatened, a minimum order should be Four Type 1 Helicopters, Four Type 2 Helicopters, and Two Type 3 Helicopters. The Type 1's for water dropping, the Type 2's for water dropping and crew shuttles, and the Type 3's for Helicopter Coordination and Recon. Although this order may seem large, helicopters often run out of flight time or go out of service mechanical.

Fix wind aircraft will also be a very important tool for fire suppression. Four airtankers with an air attack or lead plane should be the minimum order. More importantly, a "**NO DIVERT**" should be ordered as soon as likelihood of structure loss becomes possible. Please see the Flight Hazard Map.

Bulldozers will also be useful for fire line construction behind the homes. Especially behind Charlott and Locus Drive, below Pinecone Court, below Mooncrest Drive, east of Spruce Drive, and west of Cedar and Conifer Drives. Four bulldozers should be ordered.



Map 44: Flight Hazard Map indicates only the high-tension powerlines. Local smaller voltage powerlines may exist!!!

Medical Plan

Ambulance Service

Name	Location	Paramedics	
Care Ambulance	Kernville, CA		Yes

Hospitals

Name	Address	Travel-Air/Ground	Phone	Helipad	Burn Center
Ridgecrest Community Hospital	1081 N. China Lake Blvd. Ridgecrest, CA 93555	Ground-73 miles	(760) 784-1110	No	No
Kern Valley Hospital	6412 Laurel Ave. Mt. Mesa, CA 93240 Lat 35,38.04 Long 118,58.21	Ground-19.78 miles	(760) 379-2681	Yes	No
Kern Medical Center	1830 Flower Bakersfield, CA	Ground - 52.52 miles	(805) 326-2000	Yes	No Burn Center Level-2 Trauma Center
Community Medical Center	2823 Fresno Ave. Fresno, CA	Ground-163 miles	(209) 453-4000	Yes	Yes Level 1-Trauma
Sherman Oaks	4929 Van Nuys Boulevard Sherman Oaks, CA	Ground-155 miles	(818) 981-7111	Yes	Yes

Medical Emergency Procedures

Line Emergency:

Crew Supervisor will contact Strike Team Leader who will contact Division Supervisor with patient complaint/condition and location. Division Supervisor contacts the line EMT or Paramedic if assigned and the Incident Command Post.

Incident Command Post contacts

- Porterville Dispatch
- Kernville Helibase for air evacuation only.

Division Supervisor will run medical emergency on the Command Channel. The Division Supervisor will fill out the Injury or Accident Reporting Procedures Form

Porterville Dispatch will:

- Dispatch ground ambulance to nearest drop-point for ground transportation only.
- Notify receiving hospital of injury status.

Injury or Accident Reporting Procedures Form

Nature of Injury_____

Location of Patient_____

Time of Injury_____

Transportation Requested By: Air__ Ground__

Point Of Pickup_____

Lat_____ Long_____

Patient Unit Id_____

Is an EMT with patient: Yes____ No____

Is a paramedic with patient: Yes____ No____

Age_____

Sex: Male_____ Female_____

Time of Transport_____

Additional Notes/Witnesses

For all Emergencies: Secure the area and identify witnesses for later investigation.

Keep an accurate log of events and take photographs if appropriate.

Evacuation

If a wildland fire escapes initial attack and threatens the community, an evacuation order may need to be ordered and enforced. Law enforcement has the responsibility for closing areas to the public⁵⁰ and consequently to order an evacuation. During most emergency evacuations, several residents refuse to leave. To assist local agencies and the public to understand the law pertaining to evacuation, the follow information has been provided⁵¹.

For the purpose of this plan, an evacuation is considered a control on the movement of people and their property. An evacuation may be a voluntary evacuation, where the governing body recommends but does not require the evacuation of an area. Alternately, an evacuation may be mandatory, where the governing body determines that under its police power it can require the citizens of an area to leave that area in order to protect life, safety, or the general welfare of the population during an emergency. In either event, an evacuation is best ordered pursuant to either statutory authority or the Emergency Services Act. Included in the following section are examples of evacuation forms that may be adopted by the Kern County Sheriff's Department. Forms include:

- Example of Evacuation Information for Local Citizens

- Example of Evacuee Information Form

- Example of a Door-to-Door Contact Checklist

- Evacuation Contact Log

- Example of a Kern County Sheriff's Office Evacuation Refusal/Waiver

The Law Pertaining to Evacuation

There are specific statutes, in addition to the California Emergency Services Act, that provide methods for enforcing the restriction on movement of people and property.

Penal Code 148.2: Provides for punishment of persons interfering with firefighters or rescue personnel during the discharge of their duties. The code also makes it an offense to disobey orders given by firefighters or other public officers.

Penal Code 402: Pertains to interfering with personnel at the scene of an emergency. Similar to Penal Code 148.2, specifically broadens the conditions and types of personnel protected by the statute.

Penal Code 409.5: Allows specified law enforcement officers to close or restrict access to an area. The advantage of using Penal Code 409.5 to restrict the

⁵⁰ Cal. Penal Code §§ 409, 409.5, 409.6.

⁵¹ "Legal Guidelines for Controlling Movement of People and Property During an Emergency" California Office of Emergency Services June 1999.

movement of people or property is that it allows specified law enforcement officers to close an area by a verbal order on an immediate and/or selective basis. The disadvantage is that the announcement or orders may vary from officer to officer, increasing the likelihood of non-uniformity, which could provide a basis for subsequent litigation. Close supervision and coordination are essential.

The agencies and persons that have the authority to restrict the movement of people and property under Penal Code 409.5 are:

California Highway Patrol,
Sheriff's Office,
Police Department,
Marshal's Office,

Any officer or employee of the Department of Forestry and Fire Protection designated a peace officer by subdivision (g) of Cal. Penal Code 830.2,
Any officer or employee of the Department of Parks and Recreation designated a peace officer by subdivision (f) of Cal. Penal Code 830.2,
Any officer or employee of the Department of Fish and Game designated a peace officer under subdivision (e) of Cal. Penal Code 830.2,

Subdivisions (c) and (d) of section 409.5 pertain to unauthorized persons entering or refusing to leave a closed area. These sections also pertain to restricted entry into a closed area by members of the media, the general public, and affected residents.

Unauthorized Entry into a Closed Area

"Any unauthorized person who willfully and knowingly enters an area closed pursuant to subdivision (a) or (b) and who willfully remains in the area after receiving notice to evacuate or leave shall be guilty of a misdemeanor.

Restricted entry into a Closed Area for Media and Residents

"Nothing in this section shall prevent a duly authorized representative of any news service, newspaper, or radio or television station or network from entering the areas closed pursuant to this section."

The media's statutory right of access to disaster areas was clarified in the case of Leiserson v. City of San Diego in 1986. One of the issues in the case was whether a member of the media could have their access restricted because the area was "unsafe" to enter. The court reasoned that "press representatives must be given unrestricted access to disaster scenes unless police personnel at the scene reasonably determine that such unrestricted access will interfere with emergency operations."⁵²

⁵² *Leiserson v. City of San Diego*, (1986) 184 Cal. App. 3d 41, 51.

Penal Code 409.5

Penal Code 409.5 permits law enforcement officers to forcibly evacuate an area, but it is not clear. Because of a variety of issues concerning the implementation of this approach, many jurisdictions decided to warn the person and either have that person sign a waiver form if the person refused to leave, or fully document the giving of the notice to leave and that person's refusal to leave. There are potential problems with this method, such as questions of whether "duress" could be construed when a citizen signs the release under emergency conditions, and whether a mere waiver is adequate to relieve the governing body of its obligation under the police powers of the state.

Another alternative would be to have the officer order the evacuation, and should that person refuse to leave the area, the officer would arrest that person under Penal Code 148.

Occasionally a person may refuse to evacuate an area, and may advise others to do the same. Under some circumstances, that person may be subject to arrest for violation of criminal statutes such as child endangerment, cruelty to animals, suicide, and others.⁵³

Rather than relying on Penal Code § 409.5, the local governing body should consider issuing an evacuation order that specifies the following:

- whether the order is for voluntary or mandatory evacuation;
- who is going to enforce the order (police, sheriff, director of emergency services, fire department, etc.);
- what they are authorized to do (evacuate, use reasonable force to remove someone from an area);
- the relevant time period; and
- that the evacuation is issued under provisions of the Emergency Services Act, thereby invoking the penalty provisions of the Act and affording the immunities accorded.

⁵³ Cal. Penal Code §§ 273a, 273d, 401, 597.

Efficient Evacuations

Responsibilities

Kern County Fire Department's primary responsibility will be suppression of structure fires with a secondary responsibility of wildland fire containment.

Kern County Sheriff's Department's primary responsibility will be the safe evacuation of the public.

California Highway Patrol's primary responsibility of highway safety and road closures.

California Department of Transportation is charged with maintaining road closures and highway safety.

United States Forest Service's primary responsibility will be suppression of the wildland fire and structure protection.

Procedure

The Incident Commander will coordinate with the Kern County Sheriff to initiate an evacuation order.

Kern County Sheriff is responsible for the dissemination of information to local residents.

All public information will be approved by the Incident Commander.

Re-occupation of homes will occur only after the Incident Commander determines it to be safe.

Evacuees Staging Areas

In the event residents of the Greenhorn Summit Community need to relocate due to fire, affected residents will be notified to relocate to one of the following areas:

Wofford Heights Park

- Egress: Highway 155 to East Evans Road in Wofford Heights.

Glennville Rodeo Grounds

- Egress: Highway 155 west to Glennville, Glennville Rodeo Grounds.

Evans Flat Campground

- Egress: 8 miles south of Highway 155 on Rancheria Road (25S15), east side of road.

Notification to Evacuate

- If circumstances permit, attempt to notify all residents in the affected area of the possibility of an evacuation.
- Unless dangerous circumstances prohibit the above, attempt to inform residents door-to-door.
- When door-to-door contact is not possible, deputies should use PA systems, horn and emergency overhead lights.

Evacuation Control Kits

Contents:

- Evacuee Information Forms (100)
- Fluorescent 1" ribbon (10 rolls)
- Adhesive tape
- Felt tip permanent pen/markers
- Zip-lock bags (25-1 gallon capacity)

Considerations

- A majority of evacuees will secure their own accommodations rather than stay in an Evacuation Center.
- Has both the California Office of Emergency Services and the Kern County Office of Emergency Services been notified?
- Has Local Red Cross Disaster relief team been notified?
- Have Evacuation Centers been established?
- Where are they located?
- What are the best routes to travel to them?
- Will transportation assistance be necessary for evacuees?

Procedures

- Use evacuation control kit
- Contact residents door to door and inform them of the current evacuation status:
 1. Prepare to evacuate, or
 2. Evacuate (advice of evacuation route)
- Give each resident an Evacuation Form.
- If door-to-door is not possible, use the PA system
 1. Lights and siren may be necessary to gain attention
- Distribute Evacuation Forms as residents leave.
- Mark residences with a long piece of fluorescent tape.
- If time permits, decisions to evacuate due to smoke or some other extreme degradation of air quality should be coordinated with the County Health Department and National Weather Service.
- Establish:
 1. 24-hour roadblocks at point of entry
 2. Security patrol in evacuated areas
 3. Evacuated areas are closed to **ALL** unauthorized persons.
 4. Begin planning for allowing residents to permanently return to evacuated area.

Evacuation Decision Factors

- Identify evacuation areas by using commonly known boundaries rather than using "distance from" statements.
- When time permits, residents should receive individual briefings on the incident and evacuation procedures.

If the decision has been made to evacuate any portion of Alta Sierra, the entire community should be evacuated. Depending on the size and direction of fire spread, consideration should be given to evacuate upper Wofford Heights and Glenville.

Grouping specific evacuation orders (i.e. pregnant woman and children) will generate voluntary evacuation by others.

Planning for logistics of returning residents back to their home should begin as soon as the evacuation order is issued.

Street Length Triage Information

Table 44: Street Lengths

Street Name	Length
Evans Road	2 Miles
Alta Sierra Road	3 Miles
Sequoia Road	3 Miles
Pine Drive	1/2 Mile
Old State	1 Mile
Elm Drive	2 Miles
Pinecone Court	1/4 Mile
Bonita Way	1/8 Mile
Mooncrest Drive	1/4 Mile
Crescent Drive	1/8 Mile
Charlott Drive	1/8 Mile
Lotus 1/8	Mile
Conifer Lane	1/4 Mile
Laurel Drive	1/4 Mile
Ponderosa Drive	1/8 Mile
Spruce Drive	1/4 Mile
Juniper Drive	1/8 Mile
Aspen Way	1/8 Mile
Willow Drive	1/8 Mile
Oak Drive	1/8 Mile
Jay Way	1/16 Mile
Holly Drive	1/8 Mile

Example of Evacuation Information for Local Citizens

Kern County Sheriffs Office is preparing a Population Protection Guideline for the citizens in this vicinity _____. The guideline is contingency preparedness measures in the event of an evacuation in this area. The information on this sheet is being provided to you to inform you of the steps in the evacuation process and what may be necessary for you to do **IF** an evacuation occurs.

Three Stages of Evacuation

Stage 1- Alert and Warning (Voluntary Evacuation)

There is a high probability of the need to evacuate. Law enforcement personnel will attempt to make personal visits to each resident and business in the threatened area.

Residents are responsible to make arrangements to move property and livestock. Some residents, primarily those with special needs or other concerns, should relocate during this stage of evacuation.

Stage 2-Mandatory Evacuation

Evacuation is necessary in order to protect the lives of area occupants and emergency personnel responding to the incident. Law enforcement personnel shall attempt to convey this order/request to citizens door-to-door. If this is not practical or possible this information may be delivered via a Public Address System from a patrol vehicle. Should the latter method be employed the personnel may activate the emergency lights and sirens on the vehicle. Roadblocks and 24-hour patrols by law enforcement will be instituted to protect property within the evacuated area.

Stage 3- Evacuation Order Rescinded

Occupants are allowed to return as soon as it is safe.

Evacuation Routes And Centers:

A Evacuation Center has been established at: _____
In the event of an evacuation you should report to this center and check-in to let officials know that you have made it safely out of the affected area. Following check-in you have the choice of staying at the center or going elsewhere for accommodations (i.e. friends, relatives or hotels). Please provide the name and phone number of the place to which you are relocating on the provided form. We will need a point of contact and a phone number.

Keep Informed. The success of this guideline requires the cooperation and assistance of informed occupants. Stay tuned to local media outlets for updates. Listen and ask questions when an emergency service representative contacts you.

Plan Ahead. Preplanning can help you avoid last minute frustrations. Plan where you will go and what you will take when you evacuate.

Example of Evacuee Information Form⁵⁴

WARNING

This area is under an Evacuation Order
Because of:

By the order of the Kern County Sheriff Date: _____ Time: _____

Location of Evacuation Centers

Evacuee Information Form Number _____

Please Complete the following information:

Name: _____

Address: _____

Number in family: _____

When evacuated, go to: _____

Even if you plan to stay elsewhere, please check in at the nearest evacuation center. If you do not plan to stay at the center, please fill out the following information

We will be staying at

Name of Resident/Hotel: _____

Address: _____

City/State: _____

Phone Number: _____

⁵⁴ Please consult with Kern County Council prior to implementing this form to insure legality.

Example of a Door-to-Door Contact Checklist

Identify yourself and briefly explain the nature of the emergency.
Advise occupants to evacuate or to be prepared for evacuation. Tell them what the signal will be if evacuation becomes necessary.
If time permits, have occupants complete Evacuee Information Form

If time does not permit, ask evacuees to complete the Form at the Evacuation Center.

Inquire if occupants have transportation or if anyone needs special assistance. Advise to take pets and prescription drugs,
Instruct occupants on routes to use, precautions, and the location of the Evacuation Center.
If no one answers the door, ask neighbors for information. Obtain approval for forced entry if necessary to aid children, bedridden, handicapped, or elderly.
Complete Evacuation Refusal Form for persons refusing to evacuate. Log name and address of home where no one answers. Report these names and addresses to your Supervisor.
Mark evacuated residences with long strip of ribbon from Evacuation Kit.
Mark area with WARNING-AREA EVACUATED notices from the Evacuation Kit.
Maintain log of residents and addresses contacted.

Public Address Contact Checklist - When Door-to-Door Contact is NOT Possible

Select a broadcast spot for good coverage. Consider wind direction and PA carrying distance.
Stop the vehicle and give a steady tone on the siren for 10 to 15 seconds. Wait 10 to 15 seconds.
Give the message **TWICE**. Use a slow command voice. Do not shout for amplification.

Sample: "YOUR ATTENTION PLEASE. YOUR ATTENTION PLEASE. THE _____ (County Sheriff) HAS ADVISED THAT THIS NEIGHBORHOOD BE EVACUATED IMMEDIATELY, BECAUSE OF EXTREME DANGER FROM _____ LOCK YOUR HOMES AND PROCEED ON _____ (route and directions) TO _____ (Evacuation Center) PLEASE EVACUATE NOW."

Have the team patrol neighborhoods to maintain order and provide assistance to those with no transportation.

Hand out Evacuee Information Forms as residents leave the area.

Mark each dwelling, known to be evacuated, with a long piece (approx. 36') of reflective ribbon.

Mark area with "WARNING AREA EVACUATED" notice from the Evacuation Kit

Example of a Kern County Sheriff's Office Evacuation Refusal/Waiver
55

I, _____, have been advised by the Kern County Sheriff's Office to evacuate this property/location, due to extreme danger, which is evident.

I, _____, REFUSE to evacuate this property/location and acknowledge that I know and understand the hazards. If, I remain or enter this area, I hold harmless the "agency" responsible for evacuation.

I, _____, will evacuate this property/location, however, I wish to return to check my property from time to time. I acknowledge that I know and understand the hazard. I hold harmless the "agency" responsible for evacuation. I understand that if I do not check in and out at the *same* Check Point *each time* I go to and from my property, I may not be notified if the danger increases.

Address/Location where individual was advised to leave (list below):
Person REFUSING to evacuate (list information)

Print Name: _____

Date of Birth: _____

Social Security #: _____

Next of Kin (print name): _____

Address: _____

Phone #: _____

Signature: _____

Date: _____

⁵⁵ Please consult with Kern County Council prior to implementing this form to insure legality.

Road Closures

Dispatch will need to contact with the California Department of Transportation to request "Road Closure" signs.

Road closures may be initiated at the following locations⁵⁶:

- Highway 155/Evans Road at Wofford Heights turnoff
- Sawmill Road (26S03) at Rancheria Road
- Forest Highway 90 (24S15) at County Line
- Highway 155 east bound Alder Creek/Sandy Creek Road intersection
- Old State Road at Highway 155

Evacuation Routes

Evacuating the residents of Alta Sierra could be a significant problem if the fire occurs on a holiday weekend. Specifically, on Labor Day Weekend when the forest has reached peak dryness and community visitation is high. An organized evacuation is an oxymoron. Normally people wait until the last moment or the fire reaches the community faster than what is anticipated. Bringing some organization to this chaos will be a challenge for all emergency responders.

The biggest concern is the number of narrow streets found in Alta Sierra. This issue is compounded with fire apparatus trying to get into the community while the residents try to get out. Obviously, this is a very dangerous scenario. Bottlenecks are likely to occur. If this happens in a drainage under moderate or high intensity fire behavior, injury or death will certainly be probable. The roll of law enforcement to maintain some form of traffic flow can not be over emphasized!

The primary evacuation route will be Highway 155/Evans Road. Depending on the direction of fire spread, residents will drive either east or west from Alta Sierra. Old State and Rancheria Roads could be used as a secondary evacuation route if all other routes are cut off. These roads are not recommended because they are not paved, not well maintained, and are very long. Some passenger vehicles may not be able to navigate them depending on the previous winter rains and clearance.

Under a chaotic evacuation, people will leave an area the same way they made access. This could be very problematic as too many people try to leave an area with too few roads. One of the best mitigation practices employed within Alta Sierra is to enhance another road for evacuation. Currently, Ice House Road becomes Sequoia Road south of Aspen Way. At Aspen Way, the pavement ends and the road becomes very narrow, rocky, and brushed over. This road should be widened and paved for evacuation⁵⁷. Sequoia Road runs south, with a

⁵⁶ Careful coordination must be implemented to insure road closures and evacuation are performed in unison with one action not becoming detrimental to the other.

⁵⁷ More information will be offered in the Recommendations Section of this plan.

hairpin turn and bends to the north prior to intersecting Rancheria Road. If this road was improved, the heaviest amount of potential evacuees could have a second means of egress.

To determine the number of potential evacuees, each parcel was assigned a point of egress. These assignments are based on the closest points of egress combined with a goal of avoiding bottlenecks and topographic chimneys. The initial step was to identify potential hazardous areas where topographic chimneys intersect roads. The lowest areas (where water typically flows) in the topography were modeled and everywhere these areas cross a road, a point was created. Heated air, smoke, and burning embers are forced through these low areas when upslope winds surfaces. Please see Map 45 for Potential Road Danger.

The area with the highest evacuation concern is at the intersection of Alta Sierra, Cedar, and Elm Roads. This area is at the intersection of two drainages with very narrow roads. A bottleneck could also occur in this area due to the two-way traffic. There is the potential for several residents to drive this direction during evacuation because of the high number of dwellings located on these streets.

Table 45: Number of Parcels per Route of Egress Location. With the high number of vacation use homes, these numbers represent the worse case scenario. During a non-holiday period, the number of parcels needing evacuation will be lower.

Route of Egress	Number of Parcels
Alta Sierra at Evans	80
Charlott at Evans	15
Elm at Evans	27
Evans 34	
Laurel at Evans	5
Locus at Evans	7
Old State at Evans	167
Ponderosa at Evans	24
Rancheria at Evans	24
Upper Alta Sierra at Evans	1

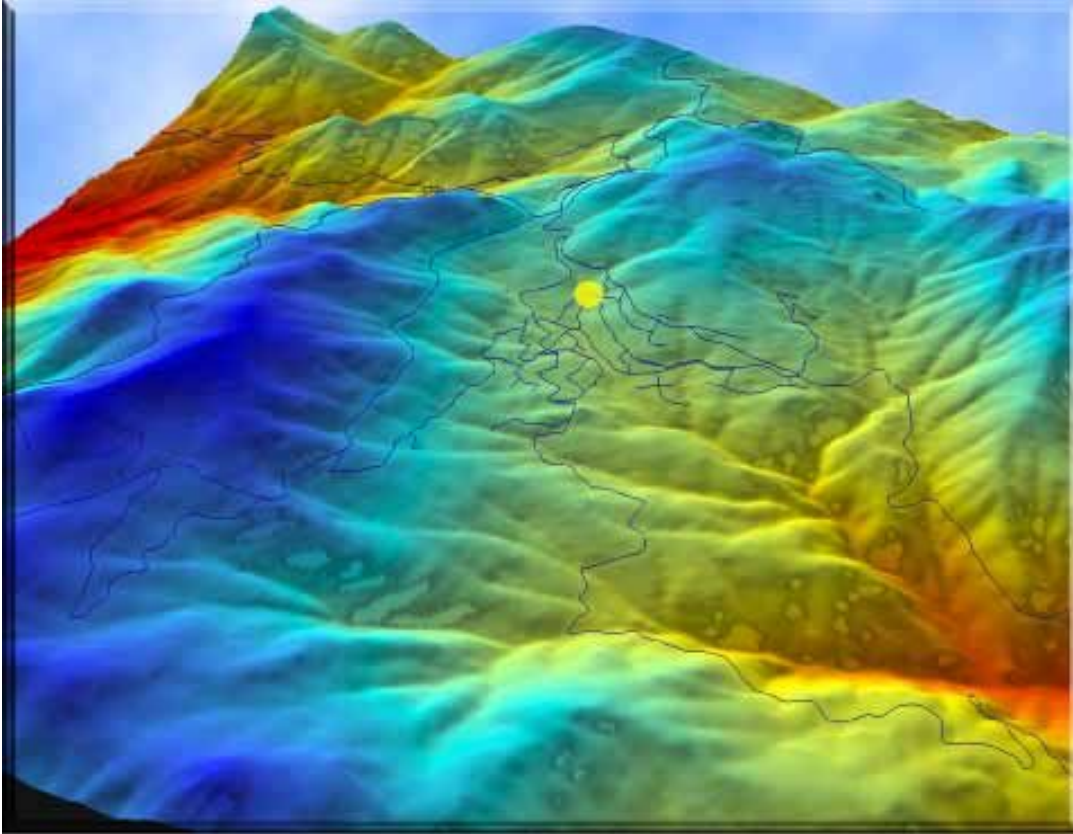
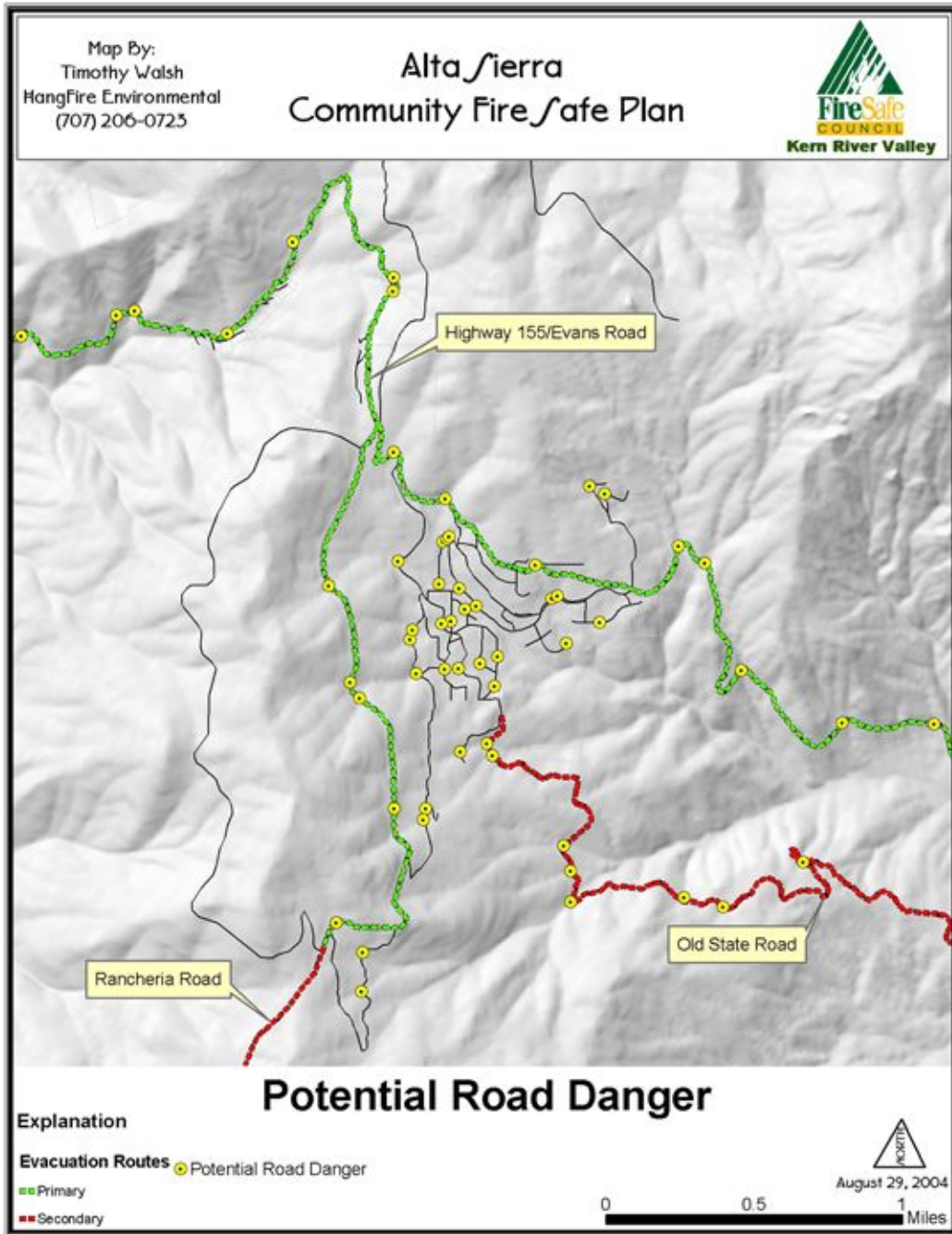


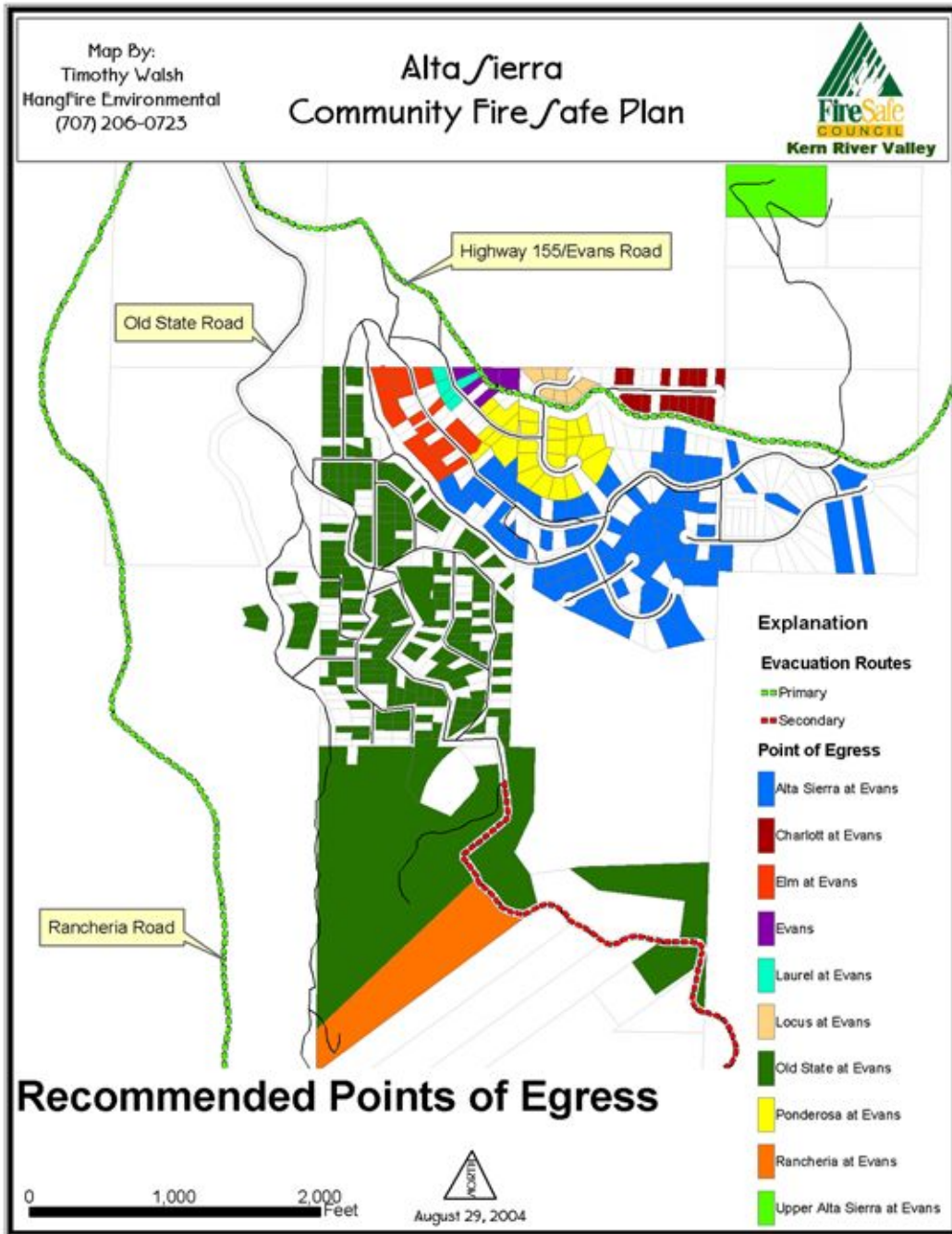
Figure 61: The yellow dot near the center of the image represents the intersection of Cedar, Alta Sierra, and Elm Roads. This intersection is at the confluence of two drainages and the roads become very narrow. With this as a main concern, a majority of the community south of Ice House Creek should be encouraged to evacuate using Old State Road.



Figure 62: This photograph was taken near the intersection of Alta Sierra, Cedar, and Elm Roads. Although the vegetation has been thinned by the Forest Service, the potential for a high intensity crown fire trapping people on the very narrow roads exist.



Map 45: Potential Road Danger is where topographic chimneys intersect a road. These areas should be avoided if possible by both fire crews and evacuees.



Map 46: Recommended Points of Egress Map. Under moderate to high intensity fires, there are no guarantees of a safe route of passage. Evans Road and Highway 155 are synonymous.

Other Reference Material

The following pages include other reference material including:

Emergency Contacts

ICS 204 Form with preliminary information filled out

GPS coordinates in degrees, minutes, second format

Emergency Contacts

Alta Sierra Property Association

Dusty Engle (760) 376-9125

Animal Relocation

Fred May (760) 379-2633 *Office*

Kern County Animal Control (760) 321-5444 *Pager*

Kern County Communications (661) 868-4000 *After Hours*

Care Ambulance (760) 376-2271 or 911-emergency

Kern County Fire-Kernville Station (760)376-2219

Power

Edison (Steve Liebel) (559) 685-3259

(559) 280-2899-Cell

Red Cross (800)

498-4882 *Chapter Office*

Jack Lemaster (760)

379-4077 *Home*

Road Closures/Safety

Cal Trans (760) 379-2808

Kern County Roads

Highway Patrol (800) 427-7623

Kern County Sheriff's Office (760) 549-2100

Maintenance Yard-Kernville (760) 376-2383

Shirley Meadows (760) 376-4186

Southern California Edison (760) 376-2235

United States Forest Service (760) 376-3210

Summit Fire Station

Water Companies

Alta Sierra Mutual Water Co

o Bill Preston (760) 376-1561

Sierra Bella Mutual Water Co.

o John E. Bishop (manager) (760) 376-4259

DIVISION ASSIGNMENT LIST		1. Branch		2. Division/Group			
3. Incident Name		4. Operational Period Date: Time:					
5. Operations Personnel							
Operations Chief				Division/Group Supervisor			
Branch Director				Air Attack Supervisor No.			
6. Resources Assigned this Period							
Strike Team/Task Force/ Resource Designator	Leader	Number Persons	Trans. Needed	Drop Off PT./Time	Pick Up PT./Time		
ST ENG							
ST ENG							
ST ENG							
WT							
WT							
C-							
C-							
C-							
7. Control Operations							
8. Special Instructions Red hydrant boxes should not be considered a reliable water source. Type 3 or 4 engines are recommended. Type 2 Water tenders are recommended / (1000 gal with short wheelbase)							
9. Division/Group Communication Summary							
Function	Frequency	System Channel	Function	Frequency	System Channel		
Command	168.675	rx/tx	King NIFC	Ch 2	Traffic Control	168.350	King NIFC Ch 10
Tactical Div/Group	168.200		King NIFC	Ch 14	Air to Ground	170.000	King NIFC Ch 12
Prepared by (Resource Unit Leader)		Approved by (Planning Section Chief)			Date		Time

Figure 63: ICS Form 214-Please duplicate for each Division and/or Group.

GPS Coordinates in Decimal Degrees⁵⁸

Latitude	Longitude	Location
35.72141667	-118.52071667	3 Lane
35.73826667	-118.55686667	Summit Fire Station
35.71510000	-118.55471667	El Monte Tract
35.64351667	-118.58890000	Evans Flat Campground
35.72475000	-118.68025000	Fulton Work Center
35.72406667	-118.67318333	Fulton Heliport
35.72611667	-118.70123333	Glennville Rodeo Grounds
35.73696667	-118.55540000	Greenhorn Mt. Park @ HWY 155
35.64436667	-118.47713333	Greenhorn District Office
35.73750000	-118.60628333	HWY 155/Alder Creek (25S04) Int
35.72731667	-118.41838333	Kernville Helibase
35.72851667	-118.55093333	Old Lodge
35.71151667	-118.56041667	Shirley Meadow Ski Area
35.71081667	-118.55665000	Shirley Meadow Tract
35.74423333	-118.56411667	Slick Rock Tract
35.74181667	-118.55851667	Summit Tract
35.74618333	-118.55613333	Weeping Springs Tract
35.70531667	-118.44975000	Wofford Heights Park
35.73025000	-118.55725000	Camp Kaweah 4 buildings
35.73280000	-118.55650000	Camp Yenis Hante 17 buildings
35.72651667	-118.70048333	Kern Co. Fire Station
35.72945000	-118.55751667	Camp Kaweah Water Tank
35.73881667	-118.55888333	Windy Gap Water Tank
35.73266667	-118.54883333	Red Mt. Water Tank
35.72505000	-118.55208333	Pine Tanks
35.70743333	-118.56078333	Shirley Meadow Water Tank
35.73363333	-118.54793333	Sierra Bella Water Tank

⁵⁸ Coordinates were provided by the United States Forest Service. They were obtained using a recreational grade GPS unit. Under tree canopy, GPS signals become very weak and may cause multi-pathing resulting in inaccuracy. These coordinates should be used to obtain a general area, not a precise location. Watertank capacities need to be verified. Some may not even have water in them.

Recommendations

The following recommendations are based on the previous assessment. As with any planning document, an alternative to any recommendation is to take no action. If this is the chosen alternative, it is only a matter of time before this choice proves dangerous or deadly.

The recommendations are based on the priority of protection of life, then property. The recommendations will be listed in priority but it should be understood that many other factors could influence whether a recommendation is implemented and in what order. Factors such as acceptance from the community, funding, and environmental issues can significantly alter if and when a recommendation is implemented.

Evacuation

Telephone Emergency Notification System

The Kern River Valley Fire Safe Council should purchase and implement a telephone emergency notification system to warn homeowners of the need to evacuate. These systems are also referred to as reverse 911 systems. During a wildfire, the notification system can deliver large volumes of phone calls quickly using multiple phone dialers. Residents can be given specific instructions during an evacuation such as what evacuation route to use and what evacuation center to utilize.

There are two ways to implement the notification system. The Council can purchase a phone dialing system or contract with a service provider. A purchased system gives the Council more control, but requires sufficient phone lines, equipment and on site technical knowledge to keep your system operational. If the system is used for multiple communities such as Wofford Heights, Kernville, and Alta Sierra, then there will be a greater capital expense required to broadcast an emergency message in a timely fashion. If the message broadcasting system is used for more than just emergencies, such as broadcasting prescribed burn information, then it may be easier to justify a system purchase over contracted service.

Contracting emergency broadcasting service requires less up front capital and can provide a faster emergency broadcast response if your provider has the resources available. Other than a monthly subscription fee, the council would only pay for the emergency broadcast as it occurs. System redundancy is available as well as centralized and experienced technical assistance.

There are several different dialing systems available as well as service providers. Prices vary on technical complexity, the number of notifications needed (Alta Sierra versus the entire Kern River Valley) the number of phone lines utilized, and the desired dialing speed (100 versus 1000 notifications per minute).

There are several companies that sell telephone dialing systems as well as services that provide emergency notification. To learn more about the systems as well as additional pricing, please enter, "Telephone Emergency Notification System" into an internet browser. The following companies⁵⁹ specialize in phone dialers and notification services:

Database Systems Corporation
1118 East Missouri Avenue
Phoenix, AZ 85014
(602)265-5968

Talking Technology International, Inc.
6558 Lucas Avenue Suite 301
Oakland, CA 94611
(510) 339-8275

National Notification Network
505 N. Brand Blvd. Suite 700
Glendale, CA 91203
(818) 239-3898

Siren Warning System

The Greenhorn Mountain Property Owners Association should install emergency warning sirens to notify resident of an evacuation. This system should be used in concert with the telephone notification system to warn people that are working outside and may not hear or have access to a telephone. The warning siren will need to be tested on a regular basis to insure operation. Sirens should have the capability to be triggered using emergency responder radios so responders could activate the siren from the field. Sirens should also be able to produce a public address to notify residents which direction to evacuate. Lastly, sirens should be installed on a building with emergency power backup. Possible siren locations could be the USFS Summit Fire Station and/or Shirley Meadows Ski Area. Generators may need to be purchased for these facilities to provide backup power. The following companies⁶⁰ specialize in emergency siren systems:

BayComm, Inc.
PO Box 3696
Greenville, DE 19807
(302) 254-8100

⁵⁹ This is not an endorsement of a specific brand or product.

⁶⁰ This is not an endorsement of a specific brand or product.

Whelen Engineering Company, Inc.
Public and Industrial Warning Products
Route 145, Winthrop Rd.
Chester, CT 06412
(800)63SIREN/(860)526-9504

Improve Sequoia Drive as an Evacuation Route

As previously mentioned, Sequoia Drive should be improved providing a much needed evacuation route to Rancheria Road. Highway 155 is the widest road in the community. The second widest and straightest road is Rancheria Road that traverses the community to the north. Currently, the entire community south of Ice House Creek will bottleneck at the intersection of Ice House Road and Old State Roads during an evacuation under high visitation conditions. If Sequoia Drive was improved, then a large number of the community could drive south on Sequoia Drive to Rancheria Road.

Improvements needed include providing an all weather surface that will not deteriorate during the winter snow and rain. Currently, the road is very rutted with large rocks and holes that make it almost impassable except with a high clearance four-wheel drive vehicle. Once the road surface is improved, vegetation should be reduced on both sides of the road for a distance of 100 feet.

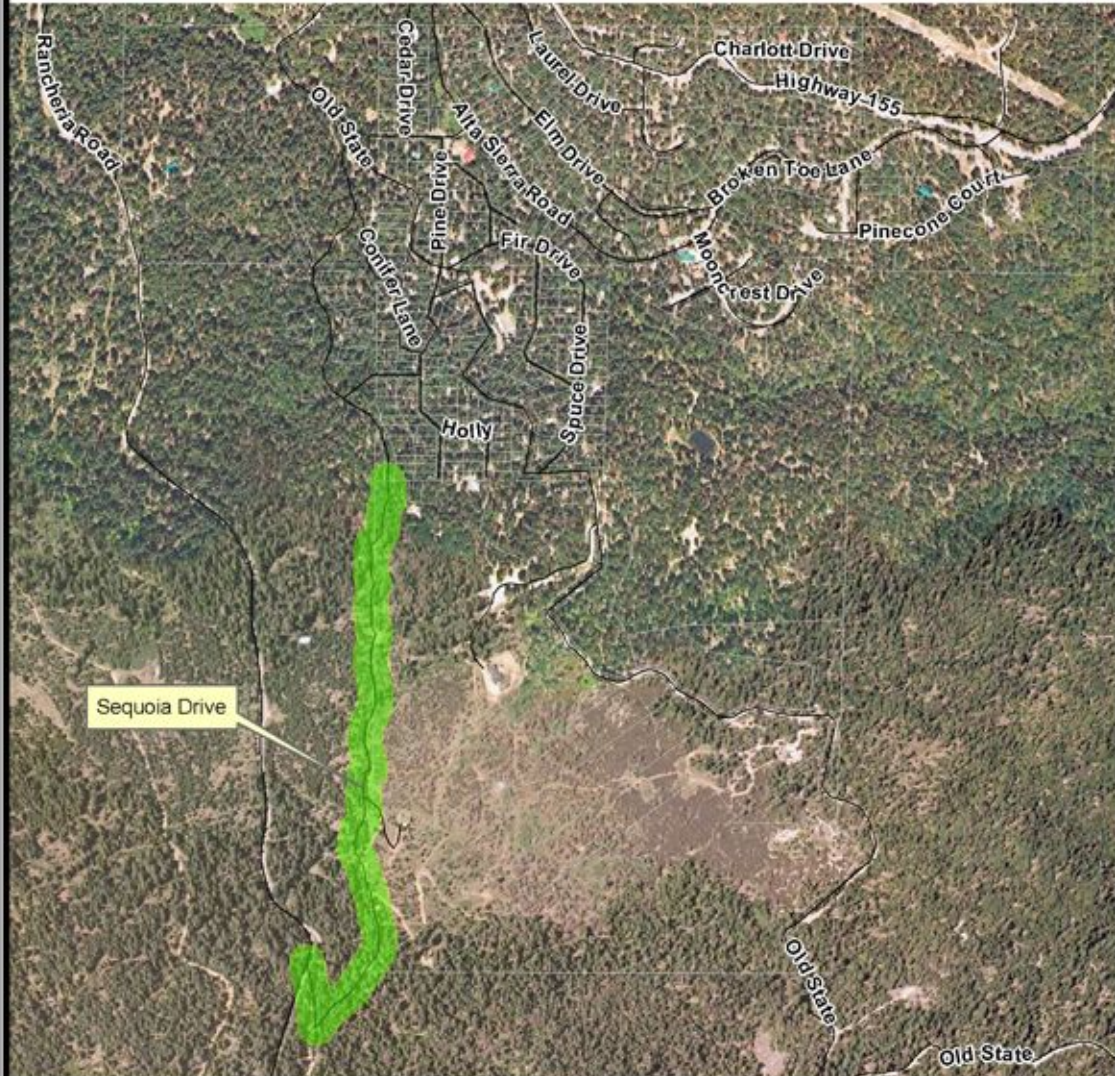
The 1973 Alta Fire has modified the fuels along Sequoia Drive. Areas within the burn scar have very little conifer regeneration, especially on the east side of the road. All brush should be removed within the fuel modification zone. Conifers should be treated in the same manner as those treated within the perimeter fuelbreak that surrounds the community. Areas that are thickets should be thinned, trees under six inches should be removed with only a small number of specimen trees left in place. Biomass can be piled and burned when fire behavior conditions are safe.

The road does not have a USFS number assigned to it. On the parcel maps, a majority of the road appears to fall on Forest Land. Although ownership will be important concerning the cost of improvement, fuel modification will occur on both private and forest lands.

The cost of the project depends on the specification and quality of the road. For example, will the road be 14 feet wide or 20 feet wide? How many inches of pavement must be used? Experts can easily answer most of these questions from the County Road Department or the Forest Service after the council decides to act on this recommendation. To reduce the cost, a possible solution may be to grade/widen the road and fill in the holes with gravel until a more permanent fix can be performed. Please see Map 47 for project area.

Map By:
Timothy Walsh
HangFire Environmental
(707) 206-0723

Alta Sierra Community Fire Safe Plan



Sequoia Drive Fuel Modification Zone

Explanation

 200 Foot Fuel Modification Zone



October 4, 2004

Map 47: Sequoia Drive Fuel Modification Zone Map. Notice the fire scare from the 1973 Alta Fire to the east of the fuel modification.

Street Width Ordinance

The Greenhorn Mountain Property Owners Association should adopt a street width ordinance based on evacuation needs. Some of the streets can be widened by removing trees. Trees that are near structures should only be removed by a license and bonded tree service by sectioning the tree and lowering it by rope or cable. Widening the streets will reduce the chance of vehicles being trapped and will also break up the continuity of the canopy possibly forcing a crown fire to the surface. Strategic turnouts should be built where possible that would allow emergency vehicles to pass on narrow roads.



Figure 64: Examples of the narrow roads that could be widened with tree removal. Several trees should be removed along the roads that would allow vehicles to possibly pass. Turnouts should also be built on narrow streets creating passing areas.

Roads that are the most narrow and should be a priority for thinning include:

- Sequoia Drive
- Southern Section of Pine
- Elm Drive
- Aspen Way
- Willow Way
- Oak Drive
- Holly Drive



Other roads that are also narrow that could be improved by thinning trees and widened with turnouts include:

- Conifer Lane
- Laurel Drive
- Spruce Drive
- Juniper Drive

Create and Adopt a Parking Ordinance

An interview with the fire captain at USFS Summit Fire Station brought a safety and evacuation issue to the surface. During the weekends and holidays, many homeowners and visitors park vehicles in such a manner that it makes maneuvering fire apparatus nearly impossible. If this condition existed during a fire, traffic congestion will result in bottlenecks. Smoke will reduce visibility making a traffic accident or firefighter injury highly probable within this confined driving environment.

It is recommended that the Greenhorn Mountain Property Owners Association designate legal parking locations along the aforementioned narrow and very narrow streets. This practice has been utilized in other jurisdictions with very narrow streets to provide a thoroughfare for emergency vehicles and/or evacuees leaving the area. Legal parking areas will be designated with white rectangular outlines painted on the ground. Vehicles that do not adhere to the parking ordinance shall be towed away at the owner's expense.

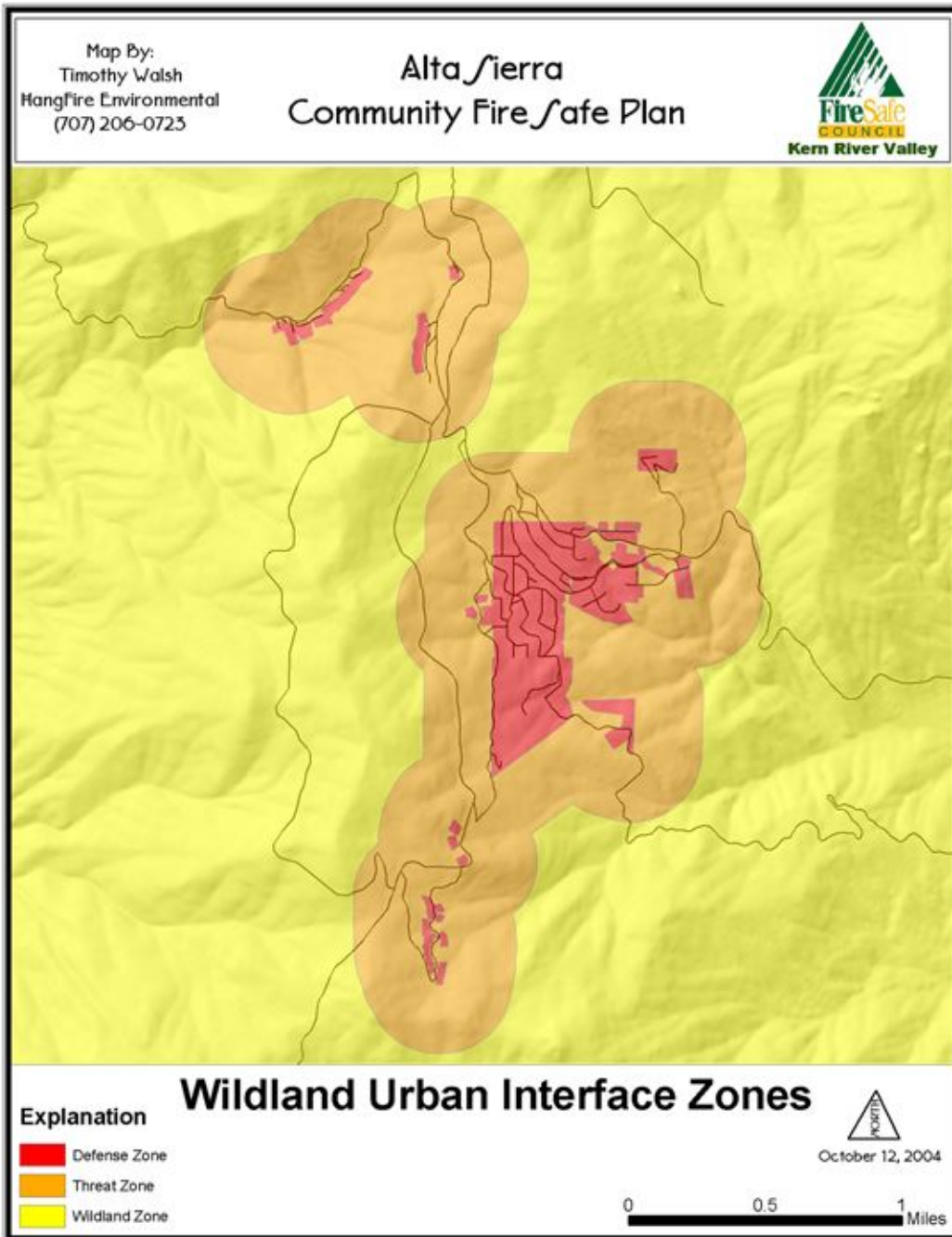
Fuel Modification

Create a Fire Defense Perimeter around the Community

Within Alta Sierra, a landscape fuels strategy aimed at modifying fire behavior across a broad area will be utilized to reduce the size and severity of large wildland fires. The goal of strategically locating fuel treatments will be easier to accomplish with the number of fuel reduction projects that have been completed or that are already planned. There are several projects that can be improved and tied together to create a fire defense perimeter around the community.

Wildland Urban Interface Zones

There are three zones that comprise the wildland urban interface (WUI). The area where structures are located is the Defense Zone. If a fire occurs or burns into this zone, structure loss is likely. The next zone comprises a one-quarter mile buffer around the Defense Zone known as the Threat Zone. This zone needs specific and intense management and treatments. Planned treatments will reduce the spread and intensity of fire developing or moving through these areas, which pose a direct threat to the Defense Zone. Physical removal of biomass coupled with prescribed fire applications are key management actions required to reduce risks in the Threat Zone. Beyond this buffer is the Wildland Zone. Please see Map 48 for a visual reference of the wildland urban interface zones.



Map 48: Wildland Urban Interface Zones are utilized to delineate fuel modification project placement. The developed parcels were buffered by 30 feet to determine the Defense Zone. The resulting area was buffered by one-quarter mile resulting in the Threat Zone. Outside of this area is the Wildland Zone.

The goals of the fuel reduction strategies are simple:

Design fuel modification to provide a buffer between developed areas and wildlands.

Design and distribute treatments to increase the efficiency of firefighting efforts and reduce risks to firefighters, the public, facilities, structures, and natural resources.

Utilize planned prescribed burns as strategically placed area treatments.

The United States Forest Service and Kern County have performed numerous fuel reduction strategies that will have a direct benefit to the Greenhorn Mountain property owners. These strategies include fuel breaks, thinning, and planning prescribed burns.

The Defense Zone

The defense zone has many positive aspects concerning wildfire. First and foremost, a majority of the homeowners provide defensible space around their structures. The Forest Service mails a flyer to homeowners providing the defensible space regulations and inspection dates. Forest Service employees follow up with inspections of properties. Those homes that fail to comply are sent a notice for follow-up that can eventually end up with a citation for failure to comply.



A practice that needs to be discouraged is when the homeowner rakes needles just beyond the 30-foot required distance but leaves the debris onsite. Although this action meets the letter of the law, it does not meet the intent. These piles of needles will cause a buildup of fire intensity, long burnout times, and considerably more mop-up.

Figure 65: The homeowner is raking pine needles from a porch complying with the firesafe cleanup notice. Notice the piles to the left of the cabin.

Another fuel reduction strategy that makes the neighborhood fuel reduction successful is the dumpsters provided by the Greenhorn Mountain Property Owners Association. During the site visit, several residents were driving to the dumpsters at Camp Kaweah. The homeowners, at a cost of \$1700.00, filled six dumpsters full of pine needles and other forest debris. If these dumpsters were not provided, several more residents would most likely rake piles to the 30-foot requirement without removing the biomass.



Figure 66: Homeowners are lined up to take advantage of the free dumpsters provided by the Greenhorn Property Owners Association.

Recommendations for the Defense Zone:

Enforce the Vacant Lot Clearance/Thinning Code

The Greenhorn Mountain Property Owners should petition Kern County to enforce the Uniform Fire Code, Appendix IIA for vacant lot maintenance. Many vacant properties threaten others by the heavy vegetation found with 30-100 feet of structures. The California Fire Code, Appendix IIA, Section 16 states,

“Persons owning, leasing, controlling, operating or maintaining buildings or structures in, upon or adjoining hazardous fire areas, and **persons owning, leasing or controlling land adjacent** to such buildings or structures, shall at all times:

1. Maintain an effective firebreak by removing and clearing away flammable vegetation and combustible growth from areas within 30 feet of such building or structures;

2. Maintain additional fire protection or firebreak by removing brush, flammable vegetation and combustible growth located from 30 feet to 100 feet from such building or structures, when required by the chief because of extra hazardous conditions causing a firebreak of only 30 feet to be insufficient to provide reasonable fire safety...

Unlike Public Resource Code 4291, a dwelling does not have to be on the property for the code to be enforceable. This code forces property owners that own vacant parcels to provide clearance within 30 to 100 feet of a neighboring house. Some property owners have done a very good job of providing defensible space to their neighbors while others have not. Kern County has adopted the code making it legal to enforce.



Figure 67: This vacant lot is located at 10525 Spruce Drive. It has been thinned and the ladder fuels were removed.



Figure 68: This vacant lot, located on Pine Cone Court, is overstocked with trees, has a moderate amount of dead and down woody material, and has low lying limbs and brush that will allow fire to travel into the crowns of the trees.

Reduce the Number of Trees throughout the Community

Several lots throughout the community have too many trees on them. During a wildfire, all vegetation is a form of fuel. Higher densities of trees equates to more fuel that is available. High fuel loading equates to higher fire intensity under high and extreme fire weather. The Kern River Valley Fire Safe Council (KRVFSC) should provide Fire Safe Site Surveys.

Utilizing the Greenhorn Mountain Property Owners Association newsletter, advise the property owners that on stated dates, the KRVFSC will inspect properties with the homeowner to advise them on which trees to thin. Property owners should contact the Council to schedule an inspection. The council could use the experts on staff (a forester from the County Parks Department) and request additional resource management experts from the Forest Service to provide tree thinning guidance to the homeowners.

Based on the number of replies (42 percent return rate) to the Fire Safe Survey found in this plan, replies for an inspection should be very high. From the answers to the survey, the homeowners are concerned that a wildfire could affect their lives. If the number of inspection requests are too many to accomplish in one or two weekends, then the inspections should be prioritized based on the information found in this plan.

One lot in particular stood out as an excellent example of thinning trees based on hazard. The lot located at 949 Alta Sierra is located on a steep south facing slope. The homeowner, realizing the fire potential, thinned the property and removed all of the ladder fuels. This lot should be defensible in all but the worse wildfire conditions. It should be a model for other homeowners throughout the community.



Figure 69: The lot located at 949 Alta Sierra has been thinned of excess trees on a steep south-facing slope. Notice the diversity to tree types and the lack of ladder fuels.

Remove All Dead Trees throughout the Community.

Throughout Alta Sierra, there are several dead or dying trees. A dead tree is a nightmare to firefighters. First, dead trees are a perfect vertical receptive fuelbed when they are still covered with brown needles. The dead needles are highly combustible due to their dryness, surface area, and arrangement. An ember from a wildfire will normally ignite trees covered with dead needles. Once ignited, they burn very fast in a torching manner. During torching, thousand of embers are blown in the direction of the prevailing wind or heat flow. Dead trees near homes will cast burning embers on/under porches, decks, woodpiles, patio furniture or any other combustible object jeopardizing the entire home, street, or community.

Another reason to remove the trees is to slow the mortality caused by the Western Pine Bark Beetle. Fallen trees should be treated to reduce further spread of infestation. More recommendations on treating trees with or near bark beetle infestation can be found at <http://ceres.ca.gov/foreststeward/pdf/treenote19.pdf>

An aerial survey should be conducted using a helicopter from either the Forest Service or Kern County Fire Department. The survey should include experts in identifying dead or dying trees, the use of Global Positioning System, and firefighting. The experts should identify tree locations and develop a prioritization system for removal. Although this survey could be done from the ground, dead trees are far easier to identify from the air, especially with dense canopy cover.



Figure 70: Pockets of mortality that surrounds the community. Rooflines of Alta Sierra can be seen in the center of the yellow circles.

Dispose of Heavy Dead and Down Found on Upper⁶¹ Alta Sierra Road

The heaviest dead and down vegetation found throughout the study area is adjacent to the new home sites on Upper Alta Sierra Road. The dead and down fuel loading caused by bark beetle mortality near the new home sites is extremely high. Two new dwellings are being built near the problem area. The property in question is most likely private but due to the proximity of the Forest Service property line, the fuel-loading problem may be shared.



Figure 71: Extremely heavy concentrations of dead and down timber found near the new building sites on Upper Alta Sierra Road.



Figure 72: Several trees in the area are showing signs of infestation as the one seen above.

Pockets of dead and down heavy timber are breeding grounds for bark beetles. Several trees in the area are already dead and more are showing signs of future mortality. The problem may not be located on Forest Service property, but the impact of infestation will surely migrate onto their lands.

Using Forest Service crews to work on private lands is usually not an excepted practice. With the joint potential of additional asset loss, maybe an exception to the rule can allow Forest Service hand crews to assist Kern County crews with fuel reduction in this area.

⁶¹ The word “Upper” is used to define the house sites north of Highway 155/Evans Road.

Create a Fuel Reduction Island

The area within the confines of Alta Sierra Road, Jay Way, Bonita Drive, and Pine Cone Court should become a fuel reduction island. This is due to the naturally thin fuels, recent clearing for development, and gentle slopes. Another reason this would be an attractive fuel reduction strategy is that according to the County's parcel data, one property owner owns a majority of the land. The Fire Safe Council should enter into an agreement with the property owner to treat the large number of parcels. According to the data, the property is under management with:

Sierra Vista Land Company
CO Eugene Veenhuis
26145 Idlewild Street
Malibu, CA 90265

At least one of the lots has recently been cleared for building a new house close to the intersection of Bonita Way and Alta Sierra Road. Additional thinning and debris removal would make this area more defensible, especially with the improved water system found in this part of the community. Please see Map 49 for a visual reference to this project.

Map By:
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Alta Sierra Community Fire Safe Plan



Fuel Reduction Island

Explanation

- Sierra Vista Land Company
- Recently Cleared

NORTH
October 17, 2004

0 500 1,000 Feet

Map 49: Fuel Reduction Island Map indicates why this area would be a great strategic place to institute fuel reduction. The blue parcels are under one owner, the area already has naturally reduced fuels, and the red shaded parcel has already been cleared.

The Threat Zone

The Threat Zone is a one-quarter mile buffer around the community. If a fire becomes established within this zone, structure loss is likely without any fuel modification. With sound fuel reduction, fires starting in the Defense or Wildland Zones should not burn through the Threat Zone with high intensities. Thankfully, there has been extensive work done within this zone surrounding Alta Sierra.

Recommendations for the Threat Zone

Limit the Number of Burn Piles

The fuel modification work performed by the United States Forest Service surrounding Alta Sierra is outstanding! With this said, piles numbering in the hundreds currently on the ground cannot be allowed to be left in place during fire season. Possibly another approach would be to combine pile creation with pile burning. After 20-30 piles are created, they would be burned prior to building more piles. While the burning of green material will possibly increase emissions, the next recommendation found in this plan may be a possible solution.

Another method to reduce the number of piles is to chip them after they are cut. While this method works, it is very time consuming compared to burning. Several of the piles on private property were chipped on site. An advantage to chipping is the lack of smoke. Long term smoke from burning may become a negative byproduct that the public may not support over time.



Figure 73: The numerous piles along Ice House Road are located adjacent to the property line of cabins.

Once these piles are consumed, the resulting fuel modification zone will allow fire crews a chance to protect the community during low and possibly moderate intensity wildfires. Work should continue to widen this area of reduced fuel. The wider the area, the greater the opportunity for firefighters to protect the community. Please see Map 50 of the Alta Sierra Perimeter Fuelbreak.

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Alta Sierra Community Fire Safe Plan



Alta Sierra Perimeter Fuelbreak

Explanation

- Forest Service Fuel Reduction
- Privately Owned Land Fuel Reduction



October 17, 2004

0 500 1,000 Feet

Map 50: The Alta Sierra Perimeter Fuelbreak that is currently being built around the community.

Purchase an Air Curtain Destructor

One of the biggest challenges concerning fuel reduction projects or timber sales is the disposal of biomass. Currently, the practice of cutting timber or thinning trees for healthy forest or neighborhood defensibility results in numerous piles of slash. These slash piles remain in place for long periods of time. During fire season, these piles would pose a great risk to the community. If ever ignited by a wildland fire, they would prove difficult to extinguish, provide a large source for long range spot fires from blowing embers, and require a number of resources for control and extinguishment.

Burning a large number of piles is a challenge due to the amount of smoke produced and the time needed for burnout to occur. Burning any biomass is becoming more and more difficult due to the restrictions mandated by air quality districts. The districts dictate how much, when, and where burns may occur. An alternative to broadcast burning or pile burning is using an air curtain destructor (ACD)

The self-contained ACDs are basically skid-mounted air curtain incineration systems including a refractory lined firebox that does not require any setup or teardown. ACDs can efficiently dispose of large quantities of forest waste products at very high temperatures with very little air emission. This safe and clean method of burning allows its operation nearly any time of year except when fire danger is too high. In addition to burning safely and cleanly, volume reductions of approximately 95 to 98 percent are achieved.

The skids and durability of the unit allow it to be dragged around the site for repositioning or from site to site depending upon the terrain and distance to be moved. The ash may be left in place, disposed of, or used as a soil amendment by mixing it with the soil at the site or other locations. ACDs are manufactured in several skid mounted sizes with burn rates ranging from 1 to 15 tons per hour.



Figure 74: Example of a medium sized Air Curtain Destructor mounted on a lowboy trailer. Photo from the AirburnerWebsite.

The biggest drawback to this tool is the cost. The units are currently available on a GSA⁶² contract ranging in price from \$55,000 to \$110,000 depending on the

⁶² United States General Services Administration.

size purchased. There would need to be a partnership or joint powers agreement to make this fiscally possible. There would be a constant demand for such a tool throughout the Sequoia National Forest and portions of the Kern River Valley. The larger units are more difficult to transport or move around to sites and need special permits for transporting over roads. ACDs should be considered when evaluating alternatives to current fuel reduction methods in urban interface areas. ACDs may not be as cost competitive in areas where broadcast burning is acceptable. Other potential advantages to ACDs include:

- Produces lower smoke emissions compared to pile or broadcast burning.

- Burns a greater variety of materials from green fuel to red slash.

- Reduces fire risk and outbreak of insect problems.

- Operates with fewer restrictions on weather and burn conditions.

- Residents in urban interface areas are more willing to accept ACD use and remove wood waste and slash fuel hazards around their homes if offered free disposal.

- The fire is contained and easily and quickly extinguished, if necessary.

The medium ⁶³ sized units run on three gallons of fuel an hour and consume between 2-6 tons of biomass per hour.



Figure 75: An air curtain destructor in use in Lake Tahoe reducing debris from bug infested trees. Photo from the Airburner website.

For more information, please see <http://www.airburners.com>, which includes a Forest Service Tech Tip and GSA Contract information.

Create Fuel Reduction Zones around the Forest Service Special Use Cabins

With the current success of the fuel modification zone surrounding the Alta Sierra proper, the same treatments should be employed around the Forest Service

⁶³ Medium is a relative term. These units weigh approximately 30,000 pounds.

Special Use Permit Cabins found in the Shirley Meadows, El Monte, Summit, Weeping Springs and Slick Rock Tracts⁶⁴. There are 32 developed cabins within these tracts. Perimeter fuel reduction zones could take advantage of the roads already in place creating larger areas of reduced fuel loading. Fuel treatment around the Shirley Meadows Tract would even provide benefit to the ski area by tying into the reduced fuel loading found in the ski area and the parking lot. Piles created behind the Slick Rock Cabins may need to be brought down to the base of the slope due to steepness.

Most of the cabin lessees have done an outstanding job of creating defensible space surrounding their cabins. Additional fuel reduction can start from this defensible space and keep working outward from the cabins. The fuel reduction should mirror the work already performed around Alta Sierra proper without leaving the piles in place over fire season. Map 51 shows the possible fuel breaks as three 100-foot buffers around the cabins.

Fuel Modification Projects-Alta Sierra South

Some of the nicest homes in the community fall outside the Alta Sierra Perimeter Fuelbreak. Most of these homes have done significant improvements to prepare for the eventual wildfire. These improvements will be addressed in the next section of the plan.



Figure 76: The view from the bathtub from one of nicer homes in the community. Photograph by Timothy Walsh.

It has been over 30 years since the Alta Fire burned in 1973. Although the fuel loading is notably less within the burn scar, especially with the conifer fuel types, it is beginning to reach climax conditions in the brush species that currently dominates the landscape. This fuelbed should be treated with small prescribed burns or mechanical treatment to reduce the density of the brush. Either treatments should connect to roads in the area or the proposed Sequoia Drive

⁶⁴ The Ice House Tract was not included because the current Alta Sierra Perimeter Fuelbreak currently offers protection to this tract.

Fuel Modification Project. Mechanical treatments are done with an excavator with a high-speed rotating blade at the end of the articulating arm called a masticator. Masticators can treat large areas of brush very quickly. One company has custom-made attachments for the masticator that allow large downed logs to be moved or dropped usually resulting in small woody debris piles. For more information on mastication services used in the Sequoia National Forest, please call Environmental Forestry Inc. (208) 762-1369.

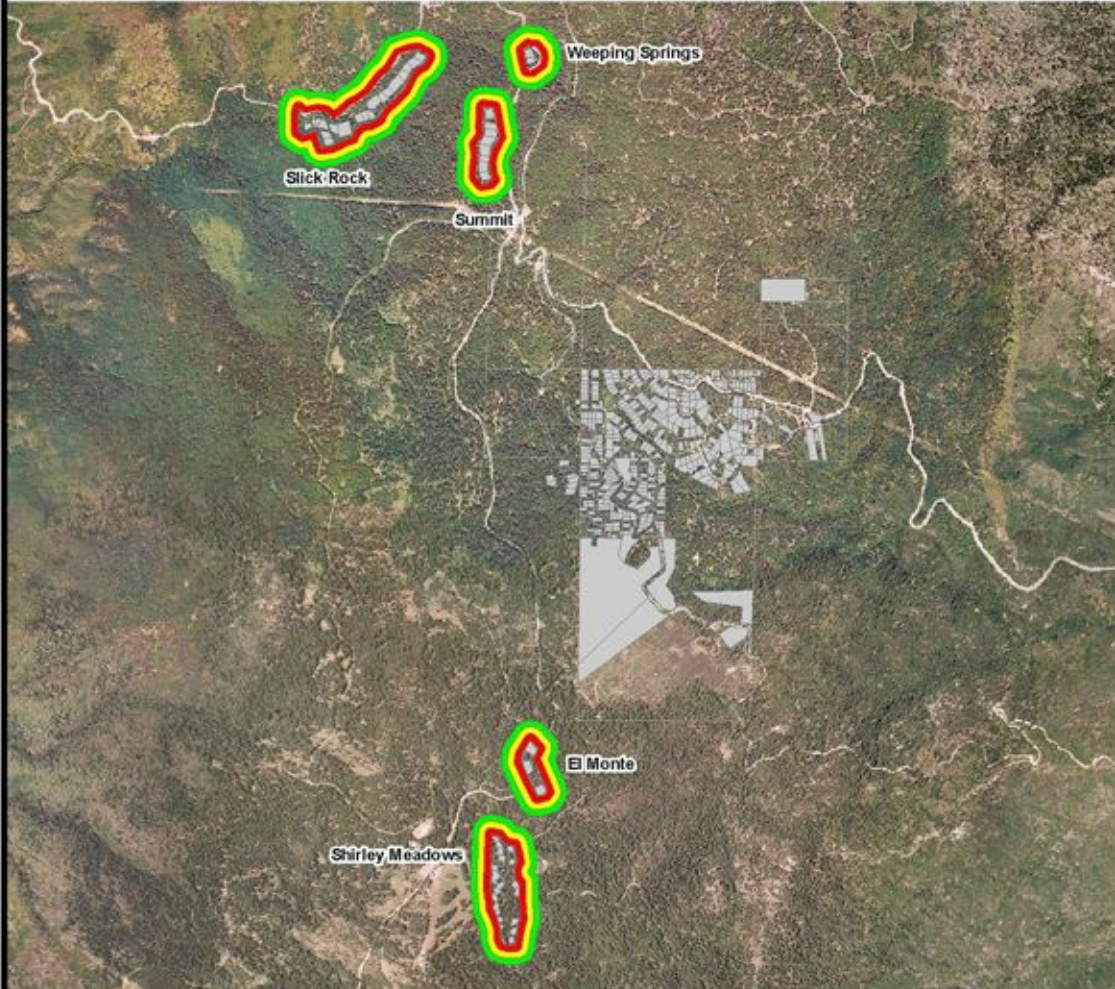


Figure 77: A masticator mulching a brush field in the wildland urban interface located in the Hume District-Sequoia National Forest. Photograph by Timothy Walsh.

Additional fuel treatment areas should be constructed around the southern perimeter of the Alta Fire. This 300-foot area should mirror the work performed around Alta Sierra proper. Old State Road will be the anchor point of this fuel reduction zone. The zone will wrap this portion of the community and tie into the propose Sequoia Drive Fuel Modification Zone. The reduction zones can start with 100-foot areas and gradually be widen to 300 feet over time. Map 52 shows small treatment areas within the Alta Fire and the Perimeter Fuel Reduction.

Map By:
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Alta Sierra Community Fire Safe Plan



Special Use Cabins Fuel Reduction Zones

Explanation

Special Use Cabin Fuel Reduction Zones Developed Parcels

Distance in Feet

- 100
- 100 - 200
- 200 - 300



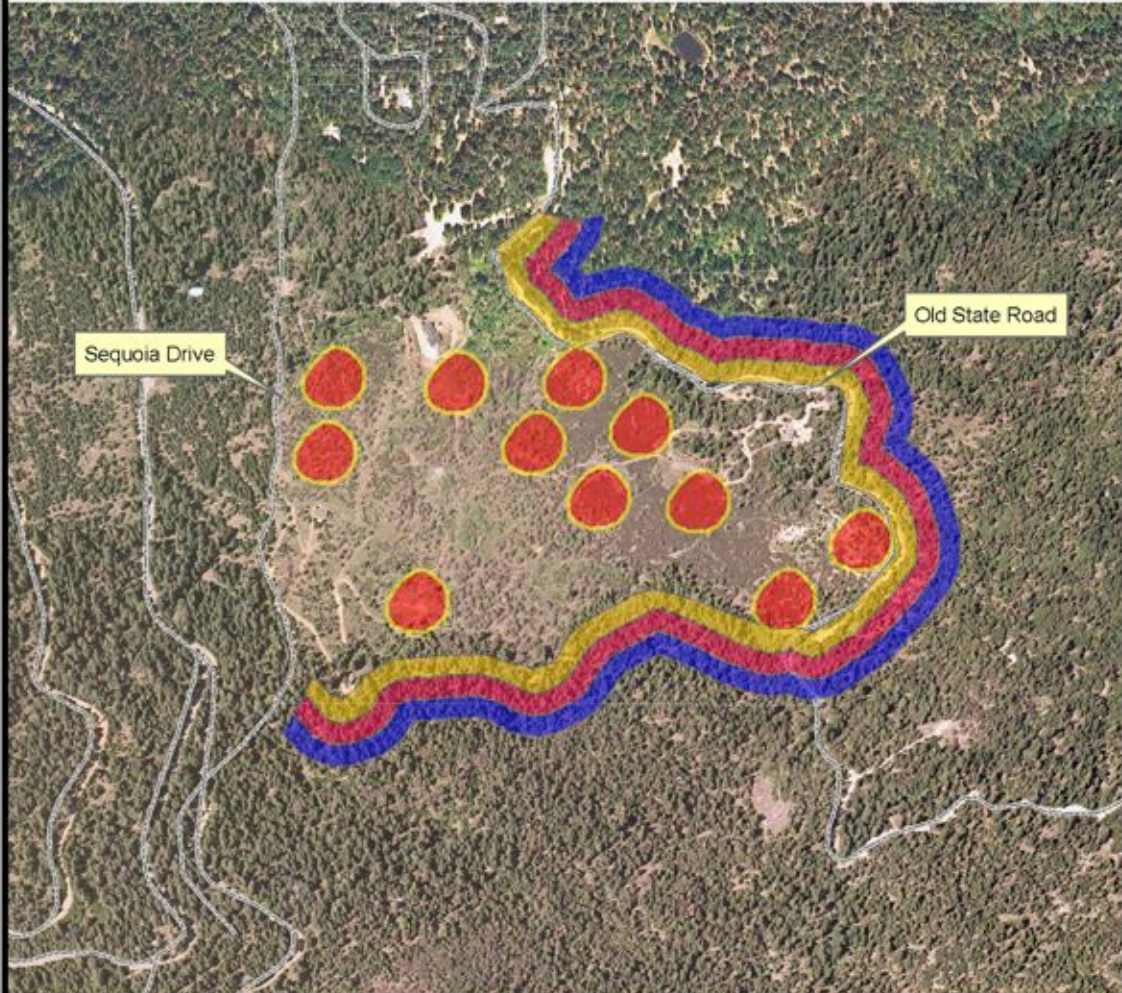
October 18, 2004



Map 51: Special Use Cabins Fuel Reduction Zones Map. The zones are displayed as three 100-foot buffers around each group of Special Use Permit Cabins. The zones could be built over multiple years increasing in size over time.

Map By:
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Alta Sierra Community Fire Safe Plan



Alta Sierra South Fuel Treatments

Explanation

 Alta Fire Fuel Treatments

Alta Fire Fuelbreak

Distance in Feet

-  0 - 100
-  101 - 200
-  201 - 300



October 18, 2004

0 500 1,000 Feet

Map 52: Alta Sierra South Fuel Treatments Map indicates potential areas within the Alta Fire of 1973 that should be treated with prescribed fire or mastication. The Alta Fire Fuelbreak should be created to offer protection to the homes outside of the Alta Sierra Perimeter Fuelbreak.

Maintain the Fuelbreak under the High Tension Powerlines

The largest continuous linear fuelbreak on the Mountain is found under the high tension powerlines that starts in Wofford Heights and continues west over the Greenhorn Summit. This fuelbreak was created by Southern California Edison to protect their lines from trees growing underneath them as well as protecting the powerlines from burning during prescribed fire projects.

This fuelbreak should be maintained providing an area with little or no vegetation. If this fuelbreak is maintained, then several projects could be designed to reduce the vegetation between the powerlines and Highway 155. A great example of the types of projects that can be tied to the Powerline Fuelbreak is the prescribed fire implemented during the spring of 2004⁶⁵.



Figure 78: This area is under the powerline fuelbreak below Upper Alta Sierra Road. Notice the amount of brush and even a few dead trees that have encroached this fuelbreak. Photograph by Timothy Walsh.

Currently, the fuelbreak is void of most trees but the undergrowth of brush is starting to encroach in some areas. Southern California Edison should be contacted to inquire if they plan to continue to maintain the break or if funding could be made available for local crews to maintain the break. The fuelbreak averages between 60-100 feet in width and provides protection from fires coming from the north. The area between the Powerline Fuelbreak and Highway 155 should continue to be a high priority for fuel reduction including prescribed burns. Please see Map 53 for a visual reference of the powerline fuelbreak.

⁶⁵ More information will be available on this project found in the Recommendations for the Wildland Zone section of this plan.

Wildland Zone

The wildland zone is beyond the one-quarter mile buffer around the community. This zone is where high intensity fires will have the greatest ability to burn unchecked prior to entering the Threat Zone. The key to successful fire control is compartmentalizing the wildland fuel into smaller parcels. This is done through creating strategically placed area treatments of fuel reduction.

Recommendations for the Wildland Zone

The Forest Service has implemented strategically placed area treatments throughout the Wildland Zone. Several prescribed burns, fuelbreaks, and fuel modification projects have occurred surrounding Alta Sierra.

Continue to Burn Blocks of the Tillie 1 and Tillie 2 Prescribed Burns

Miles of fuelbreaks have been built to support and facilitate the Tillie One and Tillie Two Prescribed Burns. It is recommended that work continue reducing the volume of fuel below and adjacent to Alta Sierra within the Tillie 1 and Tillie 2 prescribed burns. Even if the burns are kept very small, they will still prove beneficial in the event of a wildfire.

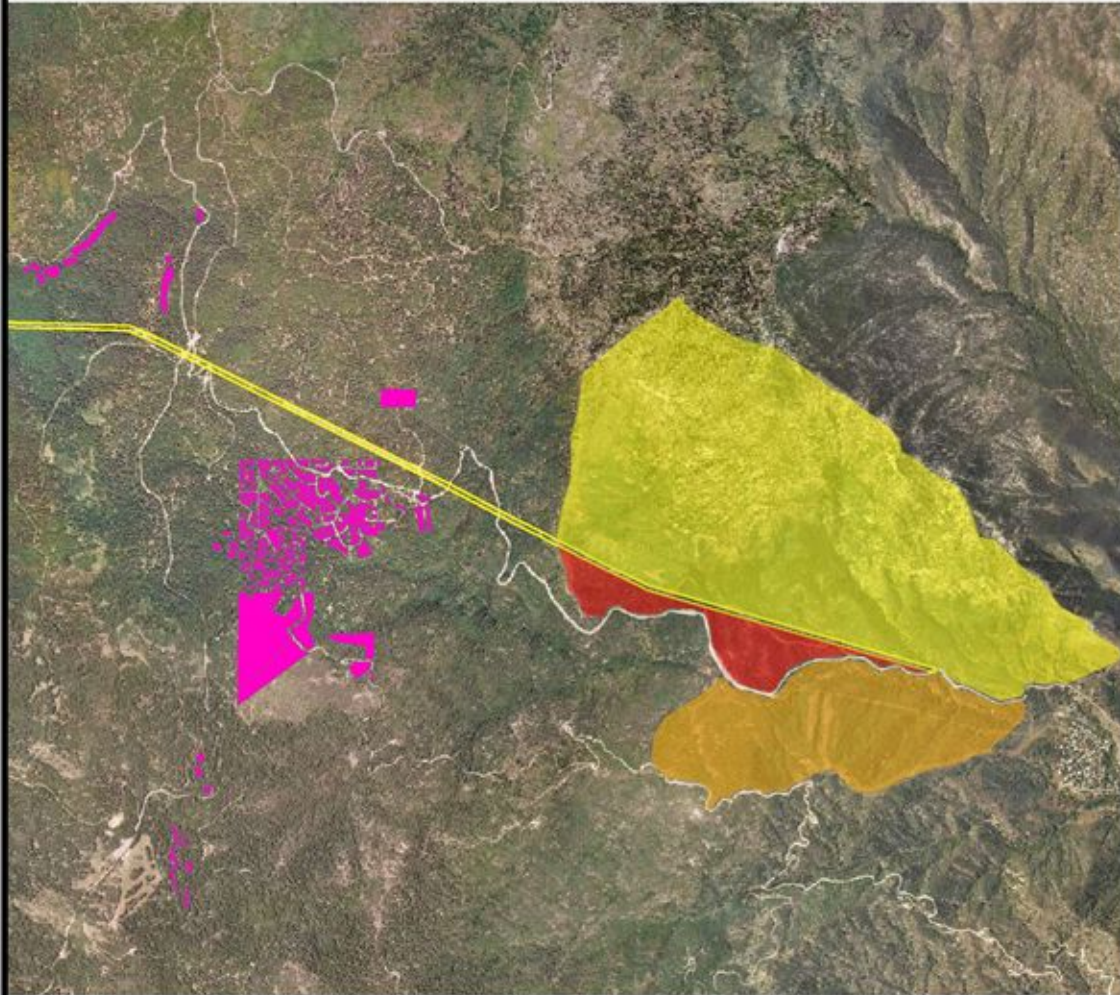
During the Spring of 2004, small burns were conducted under the Powerline Fuelbreak breaking up large areas of untreated vegetation. These burns were within the Tillie 1 burn area. The Forest Service should continue to place an emphasis on projects within the Tillie 1 and Tillie 2 projects. The area between the Powerline Fuelbreak and Highway 155 should be the highest priority within the Tillie 1 project as this takes advantage of the highway and the Powerline Fuelbreak. Please see Map 53 for the locations of prescribed burn projects.



Figure 79: Small patches of blackened vegetation can be seen below and above the powerlines from the pullout on Highway 155 below Alta Sierra. These burns are part of the Tillie 1 prescribed burn. The burns occurred in spring of 2004.

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Alta Sierra Community Fire Safe Plan



Map 53: Fuel Modification Projects found in the Wildland Zone include the Powerline Fuelbreak and the Tillie 1 and 2 Prescribed Burns.

Building Materials and Emergency Response

There is not one dwelling within Alta Sierra designed perfectly concerning wildfire. There are homes that display several traits that should be adopted on a wide scale basis. With very few exceptions, a majority of the homes are built of wood, have a wood deck or porch, and have a non-combustible roof. The reason a majority of the homes have a non-combustible roof is because of the local building/fire code. The only structural building component improved for fire protection over the last few decades is the roof. As a society, we have outlawed wood roofs but allow the rest of the home to utilize it as a primary construction material. This results in a code that states that it is ok for the house to burn from the bottom up but not from the top down!

Fortunately, Kern County is one of the first counties in the State to adopt a wildland urban interface code to insure that future construction will be done in a fire safe manner. Unfortunately, this does not help the current homes located in Alta Sierra. The following recommendations will be focused on aspects of building design and infrastructure improvements to improve Alta Sierras chances of surviving a wildfire.

Create a Condition for Renewal for USFS Special Use Permit Cabins

As stated earlier in this plan, wood roofs are a major problem in the wildland urban interface. It is recommended that any cabin leased from the United States Forest Service should replace the wood roof with a non-combustible roof prior to renewing the lease. This would make the entire neighborhood surrounding the cabins safer during a wildland or even a structure fire. Although the leases are long term, eventually there will be a way to ensure the safety of the current homes with wood roofs and those that surround them.

Remove Condemned Buildings

As mentioned earlier in this plan, all condemned building should be removed from the community as quickly as possible. They usually have several openings such as broken windows or opened doors that will allow an easy portal for a burning ember. Once ignited, they will threaten the homes surrounding them and possibly the entire community.

The Kern River Valley Fire Safe Council should invite the Kern County Code Compliance Division to devise a plan to fast track the process for removing condemned homes. A meeting should be held in Alta Sierra, where the Council can provide a tour to the members of the Code Compliance Division showing them the homes that should be removed. The following buildings should be removed from the property or repaired to a safe condition:

The Old Alta Sierra Lodge and “A “frame shack. These buildings are all boarded up and are slowly deteriorating.



Figure 80: Example of a building that should be torn down with the debris removed from the area.

The home next to 10717 Pine an old "A" frame cabin with a wood shake roof.

The home next to 10620 Juniper which appears to be falling down.

10117 Spruce which appears unstable and may be ready to fall down.

8501 Old State which appears unstable and may be ready to fall down.

The Green house across the street from 151 Laurel. There is a hole in the metal roof and it appears abandoned.

There are other homes or cabins that should be considered but it is difficult to make this determination. This is where a day or two with experts from the Code Compliance Division may prove beneficial.

To contact the Code Compliance Division, please use the following contact information:

County of Kern Code Compliance Division
Charles Lackey, Director
Public Services Building
2700 "M" Street.
Bakersfield, CA 93301-2370
Monday - Friday 8:00 A.M. - 5:00 P.M.
Phone: (661) 862-8603; 1-800-552-5376, Option 7
FAX: (661) 862-5149
email: ess@co.kern.ca.us

Adopt a Home Address Standard

Surprisingly, one of the most difficult things to do while providing structure protection during a wildland urban interface fire is finding structures by their reported address. Generally, fire engines are responding from outside the area. Compound this with a forest environment where trees can screen homes from

visibility. Add to this the decreased visibility caused by smoke. Lastly, homes may or may not post addresses. Without an address, it is purely a guess if you are at the right address. Addresses are helpful, but only if they can be easily found.

While performing the neighborhood fire safe site surveys, finding addresses was a challenge. Even with two people looking for them, it sometimes took 5 minutes before an address was found. Every possible scenario for address placement is in use. One of the more popular placements was a wood sign posted on a tree.



Figure 81: Although the addresses are clearly marked on this home, knowing which one is correct may cause confusion during a wildland fire or a medical emergency.

Wood is a poor choice concerning wildfire as it could burn making structure location and/or damage assessment difficult, time consuming, and costly.

Throughout the community, single digit addresses are found in Forest Service Special Use Cabins as well as five digit numbers. It appears that it is up to the individual lessee to post whichever address they like. Throughout the cabins found on private property, three digit, four digit, or five digit numbers were found. Some homes used both the three digit and five digit numbers.

In some communities, fire districts have codified the type, color, and placement of address numbers. When driving through these communities, emergency response equipment can quickly find addresses, even when the emergency responders are from out of the area.



Figure 82: An example of a standard address sign. A metal post would be preferred to wood in the wildland urban interface.

It is recommended that all housing tracts develop a single approved address sign code. Address signs should have all letters, numbers, and symbols created using a minimum four-inch letter with a one half inch stroke. They should be reflectorized with a contrasting background color.

Provide Fire Safe Buildings in All Campgrounds

The Kern County Parks Department owns and operates Camp Yenis Hante and Camp Kaweah. Camp Yenis Hante has 17 rustic cabins, a large kitchen, and assorted small buildings housing showers and restrooms. Camp Kaweah has a 30-person dormitory and an assortment of small buildings. The buildings in both camps are old and many of them covered with wood shakes and shingles. These buildings would burn very well and shower the community with burning embers during a wildland or structure fire.



Figure 83: An example of the buildings found at Camp Kaweah. Notice the wood shake roofs. The shack in the middle has a hole in the roof.

It is recommended that as these buildings are repaired or replaced, only fire safe building materials are utilized. The wood shake roofs should be replaced immediately with a safer composition shingle or metal. For a complete list of fire safe building materials, please see the Kern River Valley Community Fire Safe Plan prepared October 2002.

The water tank in Camp Kaweah did not appear operational. Staff from the Forest Service doubted if the tank even was full of water. It is recommended that the tank is repaired or replaced.

New Fire Station Feasibility Study

A feasibility study should be conducted to determine the need of a joint Kern County Fire Department and United State Forest Service Fire Station located at the Greenhorn Summit. According to some of the residents interviewed, more of the vacant lots are selling and more people are making Alta Sierra a full time place to live. Other statistical data supports possibly moving the personnel from Fire Station 36 in Glenville to a new joint station located where the Forest Service Summit Fire Station is located.

Although shutting down a firehouse to staff another is hugely unpopular with the local residents losing fire protection, if it is for the greater good, then it should be done. The first consideration is the direction of travel. From Alta Sierra,

everywhere is downhill, thus a faster travel time versus trying to get to Alta Sierra, which is virtually uphill from both Glenville or Wofford Heights.

The next consideration examines response needs for a second engine coverage. According to the 2000 Census data, the population of Kernville is 1736 people with over 34 percent of the population over the age of 62. The population of Wofford Heights is 2276 people with over 44 percent of the population over 62. It would be safe to assume fire protection responses will increase with this aging population. With an engine placed in Alta Sierra, an emergency response could be made downhill into Wofford Heights when the Kernville engine is committed to another response. This would be impossible from Glenville.

After the protection of life, the protection of property is the second highest priority for the fire department. Based on this premise, a geographic search was performed around each fire station. Each fire station including the proposed station in Alta Sierra was buffered into three two-mile radius circles. Within each two mile area, the number of improved parcels and assessed valuation was calculated. It becomes statistically obvious that the Summit would be a better location for the Glenville personnel. Please see Tables 46, 47 and Map 54.

Table 46: Number of Parcels within Three 2-Mile Buffers from the Proposed Alta Sierra Station and the existing Glenville Station.

Number of Aerial Miles	Proposed Alta Sierra Fire Station-Number of Improved Parcels Served	Glenville Fire Station 36-Number of Improved Parcels Served
2 304		129
4 102 66		
6 1194 30		
Total 1600 225		

Table 47: Total Assessed Valuation of the Parcels found in Table 44 ⁶⁶.

Number of Aerial Miles	Proposed Alta Fire Station-Assessed Valuation	Glenville Fire Station 36-Assessed Valuation
2 \$13,260,164		\$5,678,460
4 \$3,860,610		\$2,987,068
6 \$39,261,808		\$19,634,648
Total \$56,382,582		\$ 28,300,176

⁶⁶ These numbers are based on 2001 data. The county provided current data for the immediate Alta Sierra area but not for Glenville based on the anticipated needs of *this* plan. More recent data were requested but not available in time for this plan. It is safe to assume that the assessed valuation of Alta Sierra is much higher. This assumption is based on comparing the 2001 data to the more recent data provided. One parcel value rose from \$58,130 to \$109,643. Another factor to consider is the new construction that is occurring in Alta Sierra. During the site visit, one home was under construction, two parcels were being cleared for construction, and two homes were undergoing major remodels.

Currently, if a structure fire occurs in Alta Sierra, then firefighters must respond from Kern County Fire Department's Glenville and Kernville Fire Stations to fight the fire from inside the dwelling. The Forest Service is not allowed by policy to fight a fire from the interior due to a lack of training. With the long uphill response times, it would be safe to assume that any structure fire that occurs within Alta Sierra will have a considerable amount of damage and most likely be a total loss. During the winter, the Forest Service closes the Summit Fire Station requiring all responses to be provided by Kern County Fire Department.

A solution to this problem is to build a joint Forest Service/Kern County Fire Department Greenhorn Summit Visitor Information Center with a large fire suppression facility. This facility could function as a Kern County Fire Station with a Type II fire engine. In the same garage, the Forest Service could park the engine assigned to the Summit Fire Station. Within the fire suppression facility, a new dorm and quarters could be built for the Fulton or Rio Bravo Hotshots that would include a large training facility. The fire suppression facility could include a helipad large enough to land a type I helicopter. The County or Forest Service could actually house a helitack crew that would provide initial attack fire suppression into the County's busiest wildland fire area.

If the Visitor Information Center (VIC) was built further south on Rancheria Road, then the view of the entire Kern River Valley could be the backdrop for this facility. An interpretive area could explain the uniqueness of encountering five of California's six major bioregions that merge in the valley. Views of the Great Basin Desert, Mojave Desert, Chaparral, Sierran Forest, and Great Valley Grassland Regions can all be seen from this one viewpoint. Inside the VIC, terrain models of the Kern River showing the importance of watershed, timber, and fire management could be on display. Although today's budget will not be conducive for this project, it should be considered in the next five to ten years.

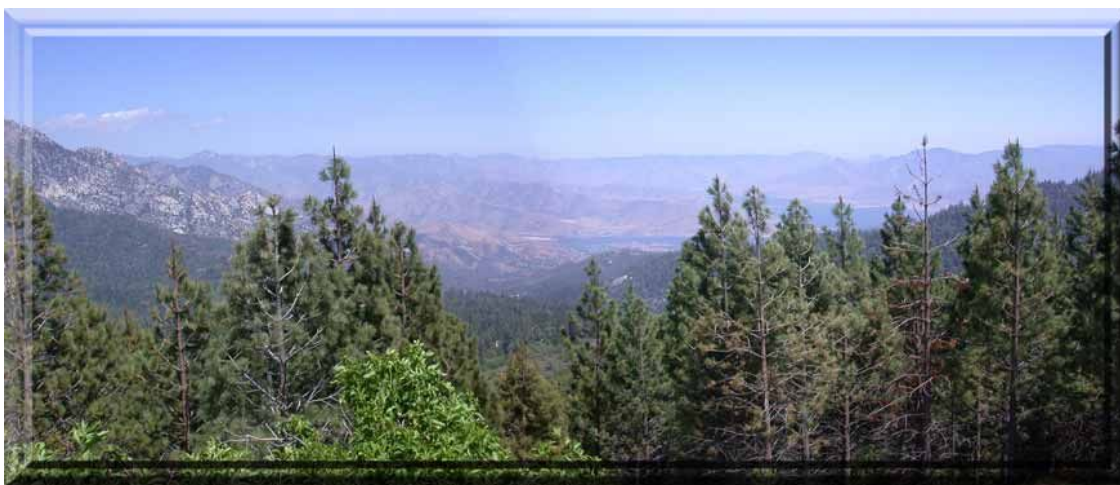
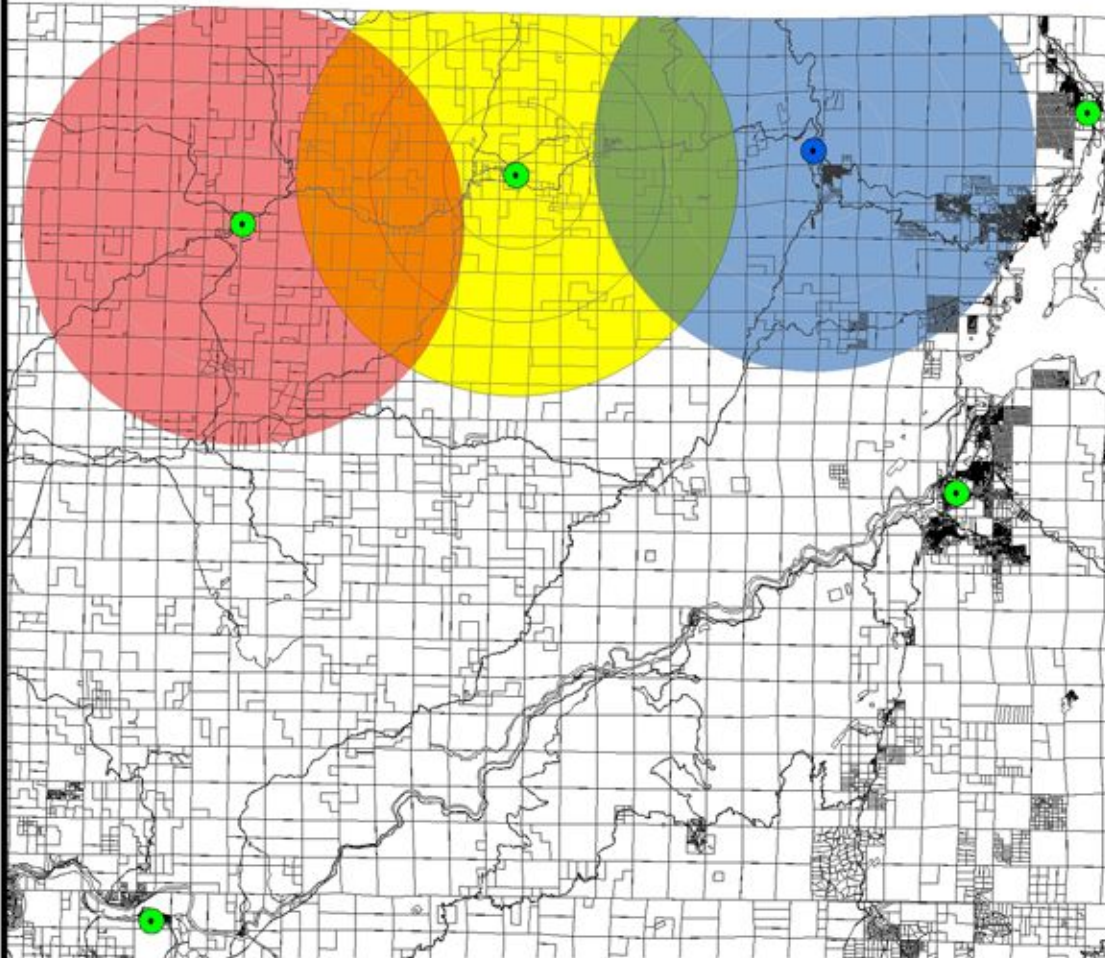


Figure 84: The perfect location, based strictly on the view, for the proposed Joint Visitor Information Fire Suppression Center. From here, one can see several bioregions at the same time.

Map By:
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Alta Sierra Community Fire Safe Plan



Parcel Coverage For the Woody, Glenville, and Proposed Alta Sierra Fire Stations

Explanation

- Proposed Alta Sierra Station
- Current Kern County Fire Stations
- Parcels served by the Glenville Fire Station
- Parcels served by the Proposed Alta Sierra Station
- Parcels served by the Woody Fire Station



October 24, 2004

0 5 10 Miles

Map 54: Parcel Coverage for the Woody, Glenville, and Proposed Alta Sierra Fire Stations Map. Notice the amount of overlap between the proposed Alta Sierra Fire Station and the Woody Fire Station. The most important feature not seen in the map is terrain. From the proposed Alta Sierra Fire Station, all destinations are downhill. The target like appearance seen in the parcel data are generated by the three 2-mile buffers around each fire station.

Building Materials for the Wildland Urban Interface

The materials used for building construction plays an integral part of a homes ability to survive a wildfire. Throughout Alta Sierra, there are some examples of fire safe measures that need to be employed on a much larger scale. All home improvements are costly. However, all of these suggestions are more cost effective than building a new cabin.

The California State Fire Marshal's Office completed a report⁶⁷ based on the 2003 Southern California Fire Siege. The report states, "Fracture of glazed window openings can provide ready entry points for fire by brands and embers. Such damaged opening can also allow for enhanced radiant heating of building interiors and contents as when such occurrences are followed by the ignition of window hangings such as draperies."

Several homes throughout the community utilize some form of exterior covering for the windows while the owners are away. Most of these are made of some



Figure 85: Metal shutters found on this cabin will provide wildfire protection to one of the more vulnerable components of the structure.

form of thin plywood. A plywood covering would provide more protection during a fire than a single pane of glass. Although if vegetation was too close or patio furniture ignited next to a window covered with plywood, it would quickly ignite and jeopardize the structure. One cabin owner utilized a better window covering material. The cabin located at 1651 Lotus installed metal shutters over the windows. These shutters will protect the windows from radiant heat and from a glass failing due to heat exposure. It is recommended that all homes invest in metal shutters.

Another building material that was only found covering two homes throughout the community was stucco. Outside of cement or block walls, stucco offers one of the best fire resistant capabilities of any siding material. Talking to residents, the phase that was repeated over again was that stucco doesn't work in the forest. The argument can be made that it works and looks better than blackened foundations, the byproduct of wood construction during a wildfire. One house that is truly prepared for the inevitable fire is located at 8301 Old State Road.

⁶⁷ Fire at the Urban Wildland Interface: *Performance of California Homes and Buildings*-IFB No.: 5CA334189 FCA No.: 05-6369 Report Date: 7/28/2004

While this home is located up a long and steep driveway, the owner has two advantages. The home is built with stucco siding with minor wood trim and the owner has provided a large amount of defensible space. It is recommended that as more homeowners remodel their aging homes, stucco be considered as a siding material.



Figure 86: The rear of 8301 shows the stucco siding and just as important, the large area of defensible space on the downslope side of the house. A new composite roof was being placed on the house during the site visit. Notice the lack of tall conifers on this side of the house. This house is within the perimeter of the Alta Fire of 1973.

Another construction method that is very popular in Alta Sierra is the use of decking. Decks allow the house to become part of the beautiful outside setting. Unfortunately, they are very susceptible to ignition as embers are blown underneath them. A defense strategy to combat this construction fault is to enclose the deck. The house at 308 Pine Drive has done an outstanding job of enclosing the deck using stucco. It is recommended that homeowners enclose their decks as a means to protect them from ignition.



Figure 87: The deck at 308 Pine Drive has been completely enclosed using a fire resistant stucco covering.

The house that has the most fire defense strategies in use is located at 10124 Sequoia Drive. Although the home is very isolated, the owners have provided numerous fire suppression advantages. The house is built of logs with the bottom portion of the house covered with a rock fascia. The perimeter of the house has sprinklers to keep the grounds irrigated and green. They can also be operated during a fire as a protection measure. The property has a 4000-gallon tank, pump, and 1-1/2 inch hose connection for firefighting. Lastly, the home has adequate defensible space.



Figure 88: The house is made of logs with a rock fascia. The eaves of the home have been boxed in not allowing embers to be blown under them compromising the structure.



Figure 89: Sprinklers protect the pump house roof.



Figure 90: A large area of defensible space below the home.



Figure 91: An 1-1/2 hose connection for fire hose.



Figure 92: A 4000-gallon water tank.

Infrastructure Improvements for Fire Suppression

Install Water Tanks within the Forest Service Cabin Tracts

Ironically, the United States Forest Service owns the area with the worst fire suppression infrastructure. Today, no one is allowed to design and build a home without mandatory fire suppression water sources. If a fire occurred in a Special Use Permit Cabin, there would only be 500 gallons available for fire suppression if the local Forest Service engine was available. By the time a water tender climbed the Mountain from either direction, the entire community could be threatened.

The Forest Service should explore placing fixed water tanks throughout their cabin tracts. The cost of an 11,000-gallon plastic tank is approximately \$5,800⁶⁸ dollars without shipping. Approximately \$200 dollars would also be needed to purchase a 2 ½-inch gate valve for a fire department connection. 11,000 gallons would be equivalent to the capacity of 22 fire engines. At least one tank should be placed at the Summit, El Monte, and Ice House Tracts. Two tanks should be placed at Shirley Meadows and Slick Rock Tracts, one on each end of the subdivisions.

Update the Alta Sierra Water System

There are two water systems that service Alta Sierra. The Sierra Bella System is the newer of the two. It is capable of providing 750 gallons per minute from one of the newer hydrants. It is supplied with a 200,000 gallon tank. The Alta Sierra System is the oldest water system serving the west and southwest portion of the community. The best indication of the Alta Sierra System is the red boxes found throughout their system. When the tanks are at capacity, they can hold 318,000 gallons. Unfortunately, the hydrants most likely do not provide sufficient pressure due to the size of the mains and their age⁶⁹. It is recommended that a feasibility study be performed to determine the water demands and fire flow for the current and expected growth of the area served by the Alta Sierra System.

⁶⁸ Prices for the water tank and gate valve quoted from www.watertanks.com or call (877) 655-1100

⁶⁹ This was based on information provided by Ed Bishop, President of the Sierra Bella Water Company.

Until the system can be updated, it is recommended that all of the boxes are lifted and the hydrants inspected. Some of the connections were buried under years of forest debris. All of the boxes should have a hole dug around the valve so that a hydrant wrench can be turned 360 degrees around the valve. The



appropriate tools were not available to flow test the hydrants. It is recommended that all of the red box hydrants are flow tested to insure operation and that all of the appropriate fire department connections are in place. Furthermore, if the water system cannot be updated in a timely manner, then plastic storage tanks should be placed strategically throughout the area similar to the recommendation made for the Forest Service Cabins.

Figure 91: A “hydrant” that has years of forest debris underneath it makes operation difficult

Feasibility Study for Alternative Water Sources

During large fire operations, one of the most effective tools for extinguishing fires are water dropping helicopters. To be the most efficient, a water source needs to be close by. Unfortunately, there are not very many water sources near Alta Sierra outside of one small pond seen in the aerial photographs. It is recommended that a feasibility study be performed to determine if a small reservoir could be constructed at Shirley Meadows Ski Area. This reservoir could possibly become a public/private partnership between the Forest Service and the operator of the ski area. During the summer, the water could be used for fire suppression and during the winter, it could be used for snowmaking.



Figure 92: An alternative water source could benefit the ski area, the Forest Service, and the citizens of Alta Sierra.

Although this is an unconventional recommendation, it may prove to be very beneficial for both parties. For example, the Keystone Resort in Colorado completed a study that looked at the effects of using reclaimed water for snowmaking. This study was designed and conducted in cooperation with the USDA Forest Service, and provides a thorough evaluation of water quality and other environmental impacts associated with snowmaking

water supply. In addition, it provides information about other water quality impacts related to ski area development and operation.

At the Okemo Mountain Resort located in Vermont, a 73 million-gallon snowmaking pond was constructed in 1994 at a cost of \$1.5 million. On a smaller scale, at Pats Peak, New Hampshire, an 18,000,000 million gallon reservoir was constructed for snowmaking purposes⁷⁰.

Fire Suppression Recommendations

Augment Staffing During Red Flag Warnings

Red Flag Warnings are declared by the National Weather Service when fire weather reaches critical levels. During Red Flag Warnings, it is recommended that Kern County Fire Department staff an additional engine and place it in service in Alta Sierra. Although Alta Sierra falls inside a Forest Service Direct Protection Area, the Forest Service is not responsible for the protection of homes or contents per policy. Placing an engine on the Mountain would be especially important if the Summit Fire Engine was assigned to a fire out of the area. An engine should also be staffed during the daylight hours during peak visitation such as Labor Day and Memorial Day Weekends.

Conduct a Structure Protection Drill

Perform a structure protection drill utilizing this plan! Once the plans are in place in the weatherproof boxes, a multi-company urban interface drill should be held. This drill would serve many purposes. First and foremost, it would allow agencies to become more familiar with the Alta Sierra community. Many of the responding fire departments are not familiar with the hazards and challenges found in Alta Sierra. This familiarity would allow responding units to identify areas of strategic strength and weakness.

Components of the drill could include:

- Briefing to explain the rules of engagement
 - Division/Group assignments
 - Safety
 - Communications use
 - Fire behavior challenges
 - Map distribution
 - Traffic patterns

A simulated wildland fire dispatch threatening several structures. Sheriffs should simulate and request the simulated resources for evacuation.

Unified command between responding agency's should be established. Develop an initial Incident Action Plan for the first operational period.

⁷⁰ All of the snowmaking data is from: <http://www.nsaa.org/nsaa/home/> where more information is available along with contact information.

A sand table⁷¹ could be built to create a three dimensional Alta Sierra where tactics and strategies could be implemented and discussed by Incident Commander and Operations Chief. Another training idea would be to use a virtual Alta Sierra showing fire spread and structure threats using a computer. Computer simulations would be projecting the simulated fire spread and structure loss on a large screen for the command staff to react to. Fire equipment could be dispatched according to where the simulated fire is spreading. Fire engines would then perform structure protection based on strategies employed by the virtual command team.

Fire engines would respond to different parts of the communities. The water system could be tapped to indicate how effective (or not) it is in the different parts of the community. The drill should include all of the responding units found on a high dispatch including the Forest Service, Kern County, the Bureau of Land Management, and the Kern County Sheriff's Department.

The lessons learned from this drill could eventually save structures, lives, and money. The drill should be held after Memorial Day when the number of visitors is low.

⁷¹ A sand table is a three dimensional model of a community. Sand tables be built out of plaster and wire mesh or professionally ordered from <http://www.solidterrainmodeling.com/>.

Appendix A-Fuel Model Guide

Fuel Model 1 describes areas where annual grass is the main vegetative component. With a wind speed of five miles per hour (mph) and fuel moisture content of eight percent⁷², this fuel type will burn at 5148 feet per hour or close to one mile per hour with 4 foot flames lengths.

Fuel Model 2 is used in areas that annual grass would be the primary carrier of the fire but with a sparse sage brush component. The sage brush will have longer burn out times slowing the forward rate of spread but with taller flames. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 2310 feet per hour or close to one half mile per hour with 6 foot flames lengths.

Fuel Model 4 is used for area covered with high concentrations of mature brush. Brush has an ability to withstand drought due to the water conservation method that inherently exists in the plants make-up. The plant emits resins that conceal the water within the plant reducing transpiration. These resins are very waxy thus flammable making fuel model 4 extremely dangerous and difficult to suppress. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 4950 feet per hour or close to one mile per hour with 19 foot flames lengths.

Fuel Model 5 is used to model conditions in sparser and younger brush. The fire is generally carried in the surface fuels that are made up of material found below the brush. The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 1188 feet per hour or less than a quarter mile per hour with 4 foot flames lengths.

Fuel Model 6 is used to model brush that is more flammable than fuel model 5 under moderate winds (greater than 8 mph). The shrubs are older, but not as tall as shrub types of model 4, nor do they contain as much fuel as model 4. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 2112 feet per hour with 6 foot flames lengths.

Fuel Model 8 is used to model short needle conifer. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 112 feet per hour with 1 foot flames lengths.

⁷² Eight percent fuel moisture is used to remain consistent with Anderson, H. C. 1983 Aids to Determining Fuel Models for Estimating Fire Behavior.

Fuel Model 9 is used for areas with conifer stands with moderate density. Fires run through the surface litter faster than model 8 and have longer flame lengths. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning. With a wind speed of five mph and a fuel moisture content of eight percent, this fuel type will burn at 495 feet per hour with 2.6 foot flames lengths.

Fuel Model 10 is used to model areas with heavy amounts of dead and down woody material. Crown fires, spotting problems, and torching of individual trees are more frequent in the fuel loading type, leading to potential fire control difficulties. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 521 feet per hour with 4.8 foot flame lengths.

Fuel Model 11 is used to model areas with light logging slash. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 363 feet per hour with 3.3 foot flames lengths.

Fuel Model 12 is used to model areas with moderate slash. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 778 feet per hour with 7.5 foot flames lengths.

Fuel Model 13 is used to model areas with heavy slash. With a wind speed of five mph and fuel moisture content of eight percent, this fuel type will burn at 924 feet per hour with 9.6 foot flames lengths.

Fuel Model 28 is used for urban areas. This is any area where homes or other development could be seen in the aerial photograph. Although areas with development can be one of the greatest contributing factors for the spread of a wildfire, there are too many structural variables needed to model the spatial diversity found in any given neighborhood. For example, a house made of stucco with enclosed decks and eaves will withstand a fire possibly without fire protection. Since it will most likely not ignite and add to the convective smoke column, it will not be a contributing factor to the spread of a fire. On the other hand, houses with wood siding, a wood roof, open decking and eaves will possibly burn even with fire protection. It would definitely add to the spread of the fire through embers lofted from the high heat outputs associated with structure fires. Without performing a time intensive neighborhood building assessment, placing a model on each home is prohibitive.




Fuel Model 97 is used for agriculture, a non-fuel.

Fuel Model 98 is used for water, a non-fuel.

Fuel Model 99 is used for barren areas.

Table 48: Fuel model loading, depth, and moisture of extinction⁷³

Fuel Model	Typical fuel complex	1 hour ton/acre	10 hour ton/acre	100 hour ton/acre	Live	Fuel bed depth-feet	Moisture of extinction dead fuels-percent
1	Short Grass (1 foot)	.74	.00 .00 .00			1 12	
2	Timber (grass and understory) ⁷⁴	2.00	1.00 .50 .50			1 15	
4	Mature chaparral (6 feet)	5.01	4.01 2.00 5.01			6 20	
5	Brush (2 feet)	1.00	.50	.00	2.00	2	20
6	Dormant brush, hardwood slash	1.50	2.50 2.00 0.00			2.5 25	
8	Hardwood litter	1.5	1.00 2.50 0.00			.2 30	
9	Timber(moderate litter and understory)	2.92	.41 .15 .00			2 25	
10	Timber(heavy litter and understory)	3.01	2.00 5.01 2.00			1 25	
11	Light logging slash	1.50	4.51 5.51 0.00			1.0 15	
12	Medium logging slash ⁷⁵	4.01	14.03 16.53		.00	2.3 20	
13	Heavy logging slash	7.01	23.04 28.05		.00	3.0 25	

-  Grass fuel models
-  Brush fuel models
-  Timber fuel models

⁷³ Anderson, H. C. 1983 Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service General Technical Manual INT-122, Intermountain Forest Experimental Station, Ogden, Utah.

⁷⁴ Used to model grass with a sparse sage brush component.

⁷⁵ Used to model Jeffery Pine in some areas of the Sequoia National Park.

Appendix B-Glossary

Access: Available routes for fire trucks and equipment to approach and defend areas or structures, including roadways, driveways, etc.

Adiabatic Lapse Rate: The rate at which temperature in a (dry) atmosphere drops as a function of height as a result of the atmosphere becoming thinner with increasing altitude.

Aspect: The direction (N, S, E, W) in which a property or slope faces. This has an effect on fire behavior and intensity.

Attic Opening: A vent which is placed on the outside of a structure that allows for airflow into the attic.

Biomass: The dry weight of all organic matter in a given ecosystem. It also refers to plant material that can be burned as fuel.

BLM: Bureau of Land Management.

Building: Any structure used or intended for supporting or sheltering any use or occupancy that is defined in the latest adopted edition of the California Building Code, except Group U, Division 1, Occupancy. For the purposes of this plan, the words "building, dwelling, cabin, and home are synonymous.

CDF: California Department of Forestry and Fire Protection.

CEQA: California Environmental Quality Act.

Class A Roof: Effective against severe fire test exposures, pursuant to section 15.202.4.4.1 of the UBC. Under such exposures, roof coverings of this class are not readily flammable, afford a fairly high degree of fire protection to the roof deck, do not slip from position, and are not expected to produce flying brands.

Class B Roof: Effective against moderate fire test exposures, pursuant to section 15.202.4.4.2 of the UBC. Under such exposures, roof coverings of this class are not readily flammable, afford a moderate degree of fire protection to the roof deck, do not slip from position, and are not expected to produce flying brands.

Class C Roof: Effective against light fire test exposure, pursuant to section 15.202.4.4.3 of the UBC. Under such exposures, roof coverings of this class are not readily flammable, afford a measurable degree of fire protection to the roof deck, do not slip from position, and are not expected to produce flying brands.

Convection Column: An area, usually in a canyon or below a ridgeline, in which an approaching fire can gain heat, speed and intensity by way of strong upward heat convection due to strong air drafts. The result is that the fire will spread uphill, with little to no chance of stopping it.

Dead-End Road: A road that has only one point of vehicular ingress/egress, including cul-de-sacs and looped roads.

Defensible Space: The area within the perimeter of a parcel, development, neighborhood, or community where basic wildland fire protection practices and measures are implemented, providing the key point of defense from an approaching wildfire or defense against encroaching wildfires or escaping structure fires. The perimeter as used herein is the area encompassing the parcel or parcels proposed for construction and/or development, excluding the physical structure itself. The area is characterized by the establishment and maintenance of emergency vehicle access, emergency water reserves, street

names and building identification, and fuel modification measures. Currently, there is legislation to increase the amount of defensible space required by Public Resource Code 4291 from 30 feet to 100 feet.

Detached Structure: Any structure located on a property which is not attached to the principal dwelling. These can include garages, sheds, fences, carports, barns, silos, decks, and many others.

Driveway: A vehicular access that serves no more than two buildings, with no more than 3 dwelling units on a single parcel, and any number of accessory buildings.

Dwelling Density: The number and proximity of human-occupied structures in a given area usually stated in number of structures per acre. This can increase fire spread and intensity by contributing large amounts of flammable fuels to a conflagration fire.

Eave: The horizontal overhang of the non-sloping edge of a roof beyond the wall.

Eave Opening: A vent located in an eave or soffit, which allows airflow into the attic and/or walls of a structure.

Egress: A way or ways by which residents and/or fire equipment may exit an area in the event of a fire emergency.

Fair Plan: A public system of cursory insurance coverage created for the purpose of insuring property risks that are unacceptable to the private sector insurance industry, such as homes with unmitigated fire hazards that are located in Very High Fire Hazard Severity Zones.

Fascia: The horizontal member that is visible at the end of the roof rafters.

Federal Responsibility Area: An area where the federal government has the primary responsibility for fire protection and management activities.

FRA: See Federal Responsibility Area

FEMA: Federal Emergency Management Agency.

Fire Hazard Mitigation: Various methods by which existing fire hazards can be reduced in a certain area, such as fuel breaks, non-combustible roofing, spark arresters, etc.

Fire Hazard Severity Zone: Any geographic area designated pursuant to Public Resources Code Section 4201 to contain the type and condition of vegetation, topography, weather, and structure density to increase the possibility of conflagration fires.

Fire History: The known frequency and intensity of fires that have occurred in a given area over a period of time.

Fire Wall: A wall which has been constructed to be fire resistant by using non-combustible materials or high fire-rated construction techniques such as solid blocking and/or treated lumber.

Fire Weather: Frequency and intensity of weather that contributes to fire occurrence, such as high temperatures, low precipitation, and high winds.

Firesafe: A term that has come to mean “taking into consideration fire risks and hazards, and acting to mitigate them.”

Fuel: Anything that will burn easily, such as vegetation and wood frame structures.

Fuelbreak: An area in which flammable materials have been cleared away or thinned out to minimize fire spread to structures and/or natural resources.

Fuel Loading: The evaluation of specific fuel components and their value expressed in tons per acre.

Fuel Model: Fuel Models are used to predict potential fire behavior. Wildland fuels have been classified into four general groups: grasses, brush, timber, and slash. Each of these groups is further divided into more detailed categories. There are 13 fuel models used to predict fire behavior, and 20 fuel models are used to establish fire danger ratings.

Fuel Moisture: Moisture content is the amount of water in a material divided by its oven dry mass. Moisture content is a key factor in determining how a specific piece of wood will burn, along with such factors as density and surface/volume ratio.

Greenbelts: A facility or land use designed for a use other than fire protection, which will slow or resist the spread of a wildfire. Includes parking lots, irrigated or landscaped areas, golf courses, parks, playgrounds, maintained vineyards, orchards, or annual crops that do not cure in the field.

Hazard: A fuel complex defined by its volume, type, condition, arrangement, and location. It determines the ease of ignition and difficulty of suppression in the event of a wildland fire. It is also the resistance to control once a wildfire starts, being the fuels, weather, and topography which adversely affect suppression efforts.

Hydrant: A valved connection on a water supply/storage system, having at least one 2-1/2 inch outlet, with male American National Fire Hose Screw Threads (NH) used to supply fire apparatus and hoses with water. Technically, the red boxes found in the older water system in Alta Sierra don't meet the description.

Ignition Resistant: Possessing properties that serve to slow or prevent possible ignition in order to slow the rate of fire spread. Can apply to vegetation or structural components.

Infrastructure: Roadways, utilities, and other basic elements of developed areas which can serve to lessen or increase the ease of access and egress, depending on their construction and location. Also refers to the system of public works of a country, state, or region, and also the resources (as personnel, buildings, or equipment) required or available for an activity.

Ingress: A way or ways by which residents and/or fire equipment may enter an area in the event of a fire emergency.

Initial Attack: The first dispatch of fire equipment sent to attack the fire. The number of resources sent on the first dispatch to a wildfire depends upon the location of the fire, the fuels in the area (vegetation, timber, homes, etc) and current weather conditions.

Limb-Up or Laddering Trees: Removal of the lowest branches in order to minimize the risk of ignition of trees by low-standing fuels. Synonymous with pruning.

Local Responsibility Area (LRA): An area in which local government has the prime responsibility for fire protection.

Mastication: A fuel treatment that reduces vegetation using an excavator with a rotating blade attached to articulating arm.

Model Ordinance: Any ordinance created for the purpose of review and/or adoption by several jurisdictions, usually produced as a template showing new regulations that should be addressed.

Mosaic: A method of vegetation management and landscaping which places groups of plants or trees together, with each group being spaced apart in such a way to prevent successive ignition of an entire area (NFPA Standard 299).

National Fire Plan: The National Fire Plan is a long-term investment that will help protect communities and natural resources, and most importantly, the lives of firefighters and the public. It is a long-term commitment based on cooperation and communication among federal agencies, states, local governments, tribes and interested publics. The federal wildland fire management agencies worked closely with these partners to prepare a 10-Year Comprehensive Strategy, completed in August 2001. An implementation plan will be developed by May 2002, to provide consistent and standard direction to implement the common purposes articulated in the Strategy and the National Fire Plan.

Natural Hazard Disclosure: A requirement of Assembly Bills 6X and 1195, by which a seller of real property must provide written disclosure of fire, earthquake, and flood hazards to a potential buyer prior to sale of the property (see Civil Code 2079.11, Government Codes 8589.3-5, 51179 and 51183.5, and Public Resources Codes 2621.9, 2694, 2696, 4125 and 4136).

Natural Hazard Disclosure Statement: A form found in Civil Code Section 1102.6, which is required to be completed by any seller or seller's agent for the purpose of notifying a potential buyer of real property that said property is in a natural hazard area, be it seismic, flood, or wildfire (SRA or LRA).

Non-Combustible: Non-flammable.

OES: Office of Emergency Services.

One-Way Road: A minimum of one traffic lane width designed for traffic flow in one direction only.

Ornamentals: Landscaping items that possess dense foliage or volatile oils which may serve to increase the fire risk to a nearby structure.

Red Flag Warnings: A warning issued by the National Weather Service for weather or fuel moisture conditions are at hazardous levels and could lead to rapid or dramatic increases in wildfire activity.

Roads, Streets, Private Lanes: Vehicular access to more than one parcel; access to any industrial or commercial occupancy, or vehicular access to a single parcel with more than two buildings or four or more dwelling units.

Roadway: Any surface designed, improved, or ordinarily used for vehicle travel.

Roof Assembly: The entire construction of a roof, including the covering (shingles, tiles, etc.), endcaps (if applicable), the underlying paper and the sheathing, which could be plywood, wafer board, slats, etc. All of these elements contribute to the ignition potential of a roof.

Roof Covering: The shingles, tiles or other top layer of a roof assembly.

Roof Requirements: Various levels of fire retardant roofing are required in different areas of California, pursuant to Health and Safety Code Section

13132.7. Wood roofing is prohibited throughout the state, unless it has passed an actual ten-year weather test.

Slope: The percentage of rise to run (45 degrees = 100%) on a hillside or road which might determine access difficulty or vulnerability to fire.

State Responsibility Area (SRA): An area in which the California Department of Forestry and Fire Protection has the primary responsibility for fire protection for both structures and natural resources. The State contracts with Kern County for the protection of the SRA within the County.

Structural Clearance: The distance around a structure from which flammable vegetation has been cleared or thinned.

Structural Density: See *Dwelling Density*.

Topography: Geographic elements of an area, including slope, existence of hills, mountains, canyons, and rough terrain.

Traffic Lane: The portion of a roadway that provides a single line of vehicle travel.

Turnaround: A roadway, unobstructed by parking, which allows for a safe opposite change of direction for emergency equipment. Design of such area may be a hammerhead/T or terminus bulb.

Turnouts: A widening in a roadway to allow vehicles to pass.

Under-Floor Area: Any area of a structure beneath the main floor that can make that structure vulnerable to ignition if not properly enclosed.

USDA: United States Department of Agriculture.

USFS: United States Forest Service or Forest Service.

Vegetation Management: Various practices of clearance, thinning or strategic placement of vegetation for the purpose of minimizing the rate of fire spread and intensity.

Vegetative Clearance: The distance from a structure to which native or ornamental vegetation has been removed or thinned.

Very High Fire Hazard Severity Zone: Any geographic area designated pursuant to Government Code Section 51178 to contain the type and condition of vegetation, topography, weather, and structure density to increase the possibility of conflagration fires.

Wildfire: An unplanned or unwanted natural or human-caused fire, or a prescribed fire that threatens to escape its bounds.

Wildland: Uncultivated land, other than fallow, neglected or maintained for such purposes as wood or range-forage production, wildlife, recreation, protective watershed cover or wilderness.

Wildland Urban Interface: A popular term used to describe an area where various structures (most notably private homes) and other human developments meet or are intermingled with forest and other vegetative fuel types.

Appendix C-Fire Safe Survey Comments

There is a separate binder included for the Kern River Valley Fire Safe Council's review that includes the returned Fire Safe Surveys. The comments without survey numbers were received after the cut off date. They are not included in the statistical analysis found in the plan but the comments were included in this section. If return addresses were found on the envelopes, they were cut off and attached to the survey. Hopefully, this will assist the Greenhorn Mountain Property Owners Association update their records.

From the surveys, the follow comments were made verbatim:

Survey # and comment:

#3 They need to make large fire breaks below Alta Sierra –between Wofford Heights and Alta Sierra-Along Evans Road.

#4 Shirley Meadows Tract (U.S. Forest Service) although we are asked to join and support Greenhorn Prop. Owners Assoc. we are not included in trash bins or provided disposal equip. when clean-up time comes. We must individually comply by bagging, trailering out of the area, all of our rakings. Therefore, I can say I would support but I am still miles by road around to their Alta Sierra dumpster. Though only a few one hundred feet up the mountain from the threat of fire from there.

#10 Cleaning up the uncleaned lots and tearing down the old non-maintained cabins would do a great deal for the appearance of the community and eliminate fuel for fires.

#13 I regularly rake and clean my lot, but it would be extremely beneficial if we had a day when limbs and leaves could be picked up in the neighborhood and hauled away.

#21 We are new to the area and would welcome any information and training regarding fire safety.

#22 Seven of us cabin owners collect our water from a spring into a large water tank.

#23 I have always advocated an ample supply and storage of water and larger water mains and fire hydrants at least one on each block. I know the cost will be high but I am willing to cooperate with the rest of the homeowners to do this because without adequate water supply our homes aren't worth much.

#42 As a previous member of GMPOA and KRVFSC, we wondered if an Alta Sierra fire horn might be a good investment. Is that still a good idea for calling everyone to a central evacuation point in the event of an emergency?

#44 Please continue to educate us and generate our support to maintain this wonderful mountain community.

#47 We do annual lot clean-ups required by U.S. Forestry! This sounds like a duplication of government involvement.

#48

1. When the shaded fuel break is worked below my property (8328 Old State) please leave a diversity of trees – not just the cedars.
2. Reinstate the fire horn that was present 15 or so years ago.
3. Deliver to each cabin door (maybe the GMPOA could do this) fire instructions. Place in water proof plastic bag. Be frank about it!
4. My cabin insurance with State Farm has gone up 20% per year for the past four years – now \$1033.

#49 Pleased to see this topic being addressed.

#55 The county campground/park is a fire hazard.

#56 Forest Service insists on clean up.

#61 The canyon between Alta Sierra and Wofford Heights is just waiting for a wildfire. Canyon needs to be clear cut of brush or controlled burn.

#62 What can be done downslope of Alta Sierra to mitigate the advancement of a wildfire originating in the Wofford Heights area?

#64 We must remember it's the forest and I would be concerned about over regulation. We want the forest look with sensible policies.

#65 Everyone that owns a lot should clear the whole lot off not just around the cabin, also cut all limbs up to 35' or 40' feet high. I had that done to all three of my lots. Also two neighbors did the same thing.

#66 Forest on the west slope of the Green Horn range is (bad) with dead wood.

#83 Our family cleans our property each year in May. However we do have a storage of cut wood to be used.

#86 I have a vacant lot, but have cleared it for brush and trimmed the trees.

#87 I believe in clear cut sections to help prevent forest fires. I have seen Yellowstone and other areas around Alta Sierra.

#91 Lot clean up is not the problem, having to haul forest trash 12 miles down the hill to the Kernville dump prevents many people from the proper clean up. It does not make sense to haul our forest trash all the way to Ridgecrest and bury this trash in the ground.

If the Forest Service is so concerned about fire – why don't they provide an area where this trash can be piled and burned during the winter. One fire in the area will wipe out every house on this hill we are in worse shape, and more fuel than the areas that were destroyed last year in southern California.

#93 Most roads are one-way no room for fire-fighters.

#99 Since we are part-time residents we are not aware of all of the issues. Education is the most important thing. We would like to comply with the guidelines, we just need to know what they are/how to find them.

#102 Our cabin (not summer home) was built in the 1920's as a summer cabin to escape the heat in Bakersfield. Most homeowners (i.e. cabin owners) do not frequent their cabins year round. MOST cabins are not "fancy". My hats off to those that choose to live year round in Greenhorn. But to try and make our area another Lake Arrowhead will certainly meet with opposition. Buzz Coffee

#103 What is the chance of cutting a huge fire break all around the community. I'm afraid of a crown fire. As I said before with lot sizes so small and clearing 30' around all structures the landscape would be naked. I think a giant defensible space around everything would be great. Especially below us. Maybe 400-500' minimum.

#104 I think most residents would do the right thing if we really knew what that meant. One thing that could really help is if the community brought in the right equipment to remove dead branches up to 15' or so. If each resident didn't have to mobilize the equipment by themselves it would be cheaper and more convenient.

#112 Our cabin is in the Slick Rock area – approx. 10 miles from Alta Sierra proper. There are 17 cabins on a dry creek below the road. The access is adequate. Water is by spring access only – no hydrants.

#113 Would only consider supporting question #16 if completely defined. Currently Forest Service has cleared all adjacent underbrush and limbs on large standing trees NW of lots on Lotus in National Forest for approx. 150 yds. Summer of 2003. Piles of debris remain to be burned as of April 2004.

#114 It was nice when we had areas where we could drop off bags of leaves, etc. Lots of people used this when we had it.

#118 We already have a clean up fuel day. It is Memorial Day weekend.

#120 The fuel break should be completed to proper standards. (Meaning it will slow or reduce a crown, brush fire to a ground fire.) Every lot should have the ladder fuels removed and the remaining trees limbed up.

#122 Appreciate any efforts to protect our sacred retreat!

#123 I'm new to the community and need a fire safety education. Just reading this questionnaire gives me some information and things to think about.

#125 NO CLEAR CUT! Demonstration lots I have seen are about the maximum clearing (fuel reduction) I will agree with.

#134 We clean up beginning of May and continue throughout the year.

#137 I would like to be informed and prepared.

#139 Many people are not removing large standing dead trees.

#146 Since our cabin is on government property below the Shirley Meadows ski tow many of the questions don't apply to us. Cabins use spring water, so not a hookup for fire equipment.

#156 Homeowners meet Memorial weekend and Labor Day weekend. Best time to present information.

#162 I clear my property as much as 4 times a year. I am also a retired San Diego firefighter.

#165 Last July 4th there were families using fire works on their property in Alta Sierra!

#168 This home has 2-1/2" house number displayed on the house facing Pine Dr. 10608 Pine Drive. I am in the process of purchasing 6" house numbers (reflective). So far I have found none. The largest is 3" or 4".

#170 This property is 10607 Pine Dr. with frontage on Conifer as well. It is a corner lot. Across the street from this cabin on Conifer there are 2 vacant lots (one has a collapsed shelter on it) full of combustible plant debris. These properties could be part of a fuel reduction project for empty lots.

We have a cabin in the Slick Rock area we use it 3 – 4 times monthly. Would be very pleased if some clean up could be done in this area, mainly downed trees and large amount of the ground debris.

Old siren to alarm residents. Fire truck back on mountain as in the past – sufficient retired fire personnel live on Mt. to operate. Thin trees on back roads to access fire trucks.

We have a cabin on Forest Service land. We clear our lot but Forest Service land has lots of dead wood, etc. Never cleared.

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